



MEMORANDUM

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TO:	Ed Lynch, RR/3 Jim Killian, WT/2	CLIENT:	Wisconsin DNR
FROM:	Fred Swed, Bob Paulson	TASK:	WISCN16740-110
DATE:	February 9, 2004	RE:	Project documentation, Part 1a: Survey Controls (Task 100 Series)

This technical memorandum is one in a series that documents the survey and mapping work performed for the WDNR by The RETEC Group (RETEC) under the Scope of Work (SOW) for Survey Control, Topographic and Bathymetric Mapping on the Lower Fox River under State Contract No.: 9DME0000012 (Change Order #1). This memo describes the approach and methods for establishing survey control along the river in OUs 1, 3, and 4. Submittal of this technical memorandum (including appendices and electronic format) fulfills the obligation for Tasks 110 and 120 of the above referenced SOW.

Approach

As part of this work effort, RETEC, working with Jenkins Survey & Design, Inc. (JSD), established a series of survey monuments along OUs 1, 3 and 4 as called for in the SOW. The purpose of these monuments would be as follows:

- To establish project controls adjacent to the river for use during all subsequent remedial design, remedy implementation and post-remedy confirmation activities
- To establish the ground control for aerial photography and subsequent topographic mapping of the project area
- To establish the control for in-water geophysical and bathymetric surveying
- To allow future, independent QC checks on the positioning of sampling boats performing work (by others) on the water
- To allow future, independent QC checks on the position of dredges or other equipment performing remediation construction on the water

In recommending the establishment of project-specific survey control, RETEC identified several desirable attributes for the siting of survey monuments. To the extent reasonable, each location should exhibit several or all of the following characteristics:

- The monuments should be located on land, at or close to the water's edge.
- They should be accessible not only during normal business hours, but also in the evenings and on weekends.



- They should be accessible by boat as well as by vehicle.
- They should provide direct line-of-sight to a large fraction of the surrounding water surface, and where possible to another monument.
- They should be GPS accessible.

WDNR's preferred coordinate system for mapping is Wisconsin Transverse Mercator (WTM) and it was agreed that this would be used for future work. While WTM is nominally a metric coordinate system, it was recommended that the coordinates be expressed in the units of feet (specifically, U.S. Survey Foot) because this would more directly lend itself to future computations of volumes, establishment of construction grid systems, equipment positioning, etc. It was also recommended that NAVD 88 be used as the vertical datum, since existing control would be more readily available and it would allow the creation of composite maps of both landside and bathymetric contours.

Methods

Locations and access approvals

Upon award of the project, RETEC began the process of identifying various public (including US Army Corp. of Engineers properties), commercial, industrial and residential properties along each OU on which monuments could be placed. Landowners were contacted in person and by telephone, and asked to participate in the project. The majority of property owners elected to participate and agreed to allow WDNR to place monuments on their property by signing an access agreement form provided by WDNR. These agreements only granted access to the location by WDNR staff and WDNR contractors. Future access to these monuments located on private property by others not covered by the WDNR agreement must contact property owners directly to obtain permission prior to accessing the monument. The WDNR is maintaining the signed access agreements received from property owners at their offices in Madison, Wisconsin. A final list of these owners, along with relevant contact information and site entry requirements, is contained in [Appendix A](#). Locator drawings for the final monuments in each OU as well as individual location tie-sheets are contained in [Appendix B](#).

Control datum

While access approvals were being secured, JSD began the controls survey work. All work was performed using Trimble 4800 Series RTK GPS equipment. It was originally anticipated that the GPS equipment would be used to locate and tie into National Geodetic Survey (NGS) monuments with published NAD 83 (1991) coordinates and NAVD 88 orthometric heights. The



1991 adjustment to NAD 83 represented the most current coordinates with which WDNR had previously worked. Using the NGS monuments with these coordinates would allow JSD to convert the values to WTM 83 coordinates using the WISCON conversion software distributed by the Wisconsin State Cartographer's Office.

As the work began, WDNR requested that, in addition to x,y coordinates and orthometric heights (elevations), the ellipsoid height be established at each new control monument. This was intended to support future GPS-based work on the project. JSD proceeded to investigate the feasibility of furnishing this information using the NAD 83 (1991) controls in the area. JSD used the NGS website to locate and list all available NGS survey monuments in the project area.

The search revealed only a limited number of NGS monuments with NAD 83 (1991) coordinates in the southern 2/3 of the project area. Further, the NGS monuments with NAD 83 (1991) coordinate values did not carry ellipsoid heights and most were either not GPS accessible or were not recoverable. The NGS search did reveal numerous NGS monuments with NAD 83 (1997) published coordinates, however. The 1997 adjustment has superseded the earlier 1991 adjustment and now represents the most current survey control in the state. The existing NGS monuments with NAD 83 (1997) coordinates also had published ellipsoid heights.

JSD consulted with the Wisconsin DOT to discuss the possibility of converting the NAD 83 (1997) coordinates back to NAD 83 (1991) coordinates in order to carry the ellipsoid heights, while still maintaining consistency with WDNR's earlier usage of the 1991 adjustment. (Glen Schaefer, P.E., R.L.S, personal communication.) The DOT indicated that there is no standard transformation from NAD 83 (1997) to NAD 83 (1991) and WISCON software does not support this transformation.

The DOT indicated that the difference between the 1991 and 1997 coordinates on the NAD 83 projection is a shift to the northwest direction of about 4 centimeters, or 0.13 ft. After discussions with DOT, the use of the NAD 83 (1997) coordinate values for this project was recommended for the following reasons:

- The NAD 83 (1997) coordinates represent the most current survey control in the state using the NAD 83 projection.
- There is an abundance of existing NAD 83 (1997) control monuments within the project area, from which new project-specific control could be developed.
- The existing NAD 83 (1997) controls were originally positioned using high-precision GPS procedures and are reliable.
- All of the NAD 83 (1997) controls have published ellipsoid heights, which were requested for this project.
- All of the NAD 83 (1997) controls were GPS accessible.



Field calibration

Since the shift between the (1991) and the (1997) adjustments was minimal, JSD proceeded to survey the 27-mile route using the NAD 83 projection with NAD 83 (1997) coordinate values. While surveying the route, JSD occupied a total of 26 NGS monuments with NAD 83 (1997) coordinate values and set additional control stations while occupying these monuments. A list of the existing NAD 83 (1997) control points used in this project is contained in [Appendix C](#).

The field calibration was performed in accordance with the WDOT's recommended procedures for high accuracy GPS surveying. It consisted of the following steps:

- Trimble's NAD 83 (1997) projection was uploaded into the data collector
- The GPS base station was set up on an existing NGS monument
- The GPS rover was then taken to 3 or 4 remote NGS monuments in the vicinity.
- At each remote monument, a total of 4 readings were taken by rotating the rod 90 degrees, through a full 360 degrees.
- Using a minimum of 5 satellite observations, each reading was required to close within 0.04'.
- If any of the 4 readings did not close, the procedure was repeated.

After the field calibration was completed, a comparison was made to published coordinate values. At existing monuments with published NAD 83 (1997) coordinates, the GPS field measurements showed differences of only 0.05 ft. or less between the JSD observations and the published NGS values for these monuments. (Note: At monuments with NAD 83 (1991) coordinates, the differences were 0.15 ft. or higher. The higher residuals observed when using the NAD 83 (1991) coordinates confirmed the desirability of using the existing NAD 83 (1997) monuments to determine the coordinate values and ellipsoid heights for the new monuments set for this project.)

The GEOID99 model was utilized to define the vertical control during field calibration procedures. Upon completing the calibrations, comparisons were made to published vertical data values and no adjustments were necessary.

New monuments

The new monuments were constructed using custom-fabricated, 4" metal disks. Depending on the local setting, they were either set into existing concrete (Type C) or placed on driven metal rods (Type F). Specific locations were selected to provide comparative stability, while considering and balancing the other siting criteria described above.

Existing monuments.

In addition to placement of new monuments, existing monuments within the project area were identified and included into this control network. [Appendix A](#) identifies the existing monuments incorporated into the project control network. The OU locator maps provided in [Appendix B](#) identify these monuments, however individual tie-sheets were not prepared as these monuments were not placed as part of this project. It should also be noted that the coordinates (horizontal and vertical) for these monuments included in [Appendix A](#) specifically relate to this project control effort. Caution is advised when using these coordinates, as they may be different than previously published values.

Results

The final coordinate values for the new monuments are contained in [Appendix D](#). Because different users may wish to use different coordinate systems, the horizontal coordinates are expressed 3 ways:

- as latitude and longitude
- as Wisconsin State Plane, Central Zone (in feet), and
- as WTM coordinates (in feet.)

NAVD 88 orthometric heights (elevation), ellipsoid heights and dynamic heights are also provided.

Discussion concerning data transformation between NAD 83 (1991) and NAD 83 (1997)

Past data on the Lower Fox River project has been generated in various datums, the most recent being the (1991) adjustment to NAD 83. As described above, the original workplan for this project anticipated that the (1991) adjustment would be used, since this was the most recent projection with which WDNR staff had worked. After beginning the work, however, it became apparent that the (1997) adjustment was more current, and now provides the highest degree of accuracy and usability.

It is recognized that users of the mapping generated from this project may wish to superimpose earlier environmental data on to it. Since there is no recognized global transformation between the (1991) and (1997) adjustments, users have at least two options:

- A user can simply assume that the NAD 83 (1991) and NAD 83 (1997) coordinates are equivalent for their particular purpose. As described above, the typical shift in northeast Wisconsin from 1991 to 1997 is estimated by the DOT to be approximately 4 cm. This is almost certainly within the accuracy of the original data collection, considering the difficulties of exact positioning of water craft, the precision of GPS units used in the past, the accuracy tolerances on past work, etc. (For example, in the past WDNR has requested that



geographic coordinates – latitude and longitude - be reported to 2 decimal places. When transformed in to WTM, such a standard results in a precision of about 1.0 ft. for the northing and about 0.7 ft. for the easting. Using this level of reporting, a 4 cm. difference between the 1991 and 1997 coordinate values would be inconsequential.)

- Alternatively, a user could apply an approximate numerical correction to transform coordinate values of past data from NAD 83 (1991) to NAD 83 (1997). Using several of the Wisconsin HARN points in the project area, such an approximation is calculated in [Appendix E](#). This calculation suggests that, when working across the Lower Fox River project area, WTM 83 (1991) data could be migrated to WTM 83 (1997) by adding an average of 0.09 ft. to the northing and by subtracting an average of 0.09 ft. from the easting. Such an approximate transformation would probably result in accuracy down to the sub-centimeter range. Again, this would probably be well within the accuracy's associated with the original data collection.

Appendices

Appendix A	Access Summary, December 8, 2003
Appendix B	Operable Unit locator drawings, Revision C (3 @ 11" x 17") and individual monument locator tie-sheets
Appendix C	List of existing NGS control points used
Appendix D	Coordinate values and heights for control points
Appendix E	Calculation of shift in WTM coordinates from NAD 83 (1991) to NAD 83 (1997) at WDOT HARN locations

Electronic deliverables provided on CD include:

- Copy of Project Technical Memo including all appendices in pdf format
- MS Excel spreadsheet containing final monument coordinates



APPENDIX A

ACCESS SUMMARY

December 12, 2003

APPENDIX A

ACCESS SUMMARY

December 12, 2003

The monuments installed by WDNR are located on public and private properties. WDNR has been granted permission from the property owners for WDNR employees and their contractors to install and use these monuments. Site entry requirements for WDNR employees and their contractors are described below. The originals of the access agreements with WDNR are included in WDNR's Lower Fox River files at their Madison offices.

For monuments located on private property, parties wishing to access these monuments (but who are not WDNR employees or contractors) must contact those property owners directly to obtain permission prior to attempting to access the monument.

Number	Location	Owner and/or Contact Person	Public or Private?	Site Entry Requirements/Comments
OU1-01	Bergstrom fill	City of Neenah Mike Jurgenson Engineering Dept. P: 920.886.6246	Public	<ul style="list-style-type: none"> None
OU1-02	Neenah-Menasha POTW	Neenah-Menasha Sanitary District Randy Much Plant Manager P: 920.751.4760	Public utility, but with restricted access	<ul style="list-style-type: none"> Sign in at front desk of plant, notifying Randy or the plant superintendent
OU1-03	Fritze Park Town of Menasha	Town of Menasha Mike Kading Parks Director P: 920.720.7108	Public	<ul style="list-style-type: none"> None
OU1-04	SCA Mill 190 Tayco St. Menasha	SCA Jill Hiroskey P: 920.725.7030 (ext. 2338)	Private, industrial	<ul style="list-style-type: none"> Contractors must provide Certificate of Insurance to Jill. Sign in at Guard Desk at main entrance for any work on plant property. Follow plant safety SOP (provided by SCA and dated 10.3.03.) If personnel remain in boat only, call Guard Desk as a courtesy.
OU1-05	HWY 441 Right-of-way	WDOT Bob Pavlick P: 920.492.5646	Public	<ul style="list-style-type: none"> No requirements, per se, if personnel do not interfere with traffic on the 441 bridge.
OU1-06	Butte Des Morts Park Town of Menasha	Town of Menasha Mike Kading Parks Director P: 920.720.7108	Public	<ul style="list-style-type: none"> None
OU1-07	2484 Strobe Island Town of Menasha	Condo owners association Jeanne Krueger (one owner out of 10, who happens to be the Town Clerk) Office: 920.720.7149	Private, residential	<ul style="list-style-type: none"> Location is in the sideyard of a condominium complex and is accessible from the main driveway. As a courtesy, call Jeanne or leave a message at her municipal office at least a day prior to work.
OU1-08	1729 S. Hillcrest Dr. Appleton	Mr. & Mrs. James Rudolf P: 920.739.8752	Private, residential	<ul style="list-style-type: none"> Location is in the backyard of the residence. As a courtesy, call owner or leave message a day or two prior to accessing the monument. Ring bell at time of work to announce visit, before walking around to back of house.
OU1-09	1411 Palisades Dr. Town of Menasha	Karl Aldinger (resident and owner) P: 920.731.4720	Private, residential	<ul style="list-style-type: none"> Location is across the street from the front yard of the residence, and is accessible from the street. As a courtesy, call Mr. Aldinger or leave message on their machine a day in advance of work. Do not interfere with lawn mowing.

80-28	Lutz Park Lutz Drive Appleton		Public	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU1. Location is within the City park.
OU1-10	Lutz Park Lutz Drive Appleton	City of Appleton Bill Lecker Parks Dept. P: 920.832.5910	Public	<ul style="list-style-type: none"> None
94-2	Appleton Lock and Dam @ Viking Heritage Park Appleton		Public	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU1. Location is accessible from the adjacent City park.
OU1-11	Viking Heritage Park @ USACE dam Appleton	City of Appleton Bill Lecker Parks Dept. P: 920.832.5910	Public	<ul style="list-style-type: none"> None
80-08 (1960)	Little Rapids Lock and Dam	USACE Robert Stanik Chief, Fox River Sub-Office P: 920.766.3531	Public agency, but with restricted access	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU3. Location is inside a locked gate. Crew can call and stop at Mr. Stanik's office during business hours to sign out a key (1008 Augustine St., Kaukauna.)
OU3-01	Little Rapids Lock and Dam	USACE Robert Stanik Chief, Fox River Sub-Office P: 920.766.3531.	Public agency, but with restricted access	<ul style="list-style-type: none"> Location is inside a locked gate. Crew can call and stop at Mr. Stanik's office during business hours to sign out a key (1008 Augustine St., Kaukauna.)
OU3-02	4120 Old Military Road Town of Rockland	Michael & Melissa Cuene P: 920.336.5242	Private, residential	<ul style="list-style-type: none"> Location is in the backyard of the residence. As a courtesy, call owner or leave message a day or two prior to accessing the monument. Ring bell at time of work to announce visit, before walking around to back of house.
OU3-03	2668 Lost Dauphin Rd. Town of Lawrence	Chris and Andrea Landwehr P: 920.337.0421 C: 920.366.0298	Private, residential	<ul style="list-style-type: none"> Location is across the street from the front yard of the residence, and is accessible from the street. As a courtesy, call owner or leave message a day or two prior to accessing the monument.
OU3-04	3458 Solitude Rd. Town of Rockland	Paul & Carol Coppo P: 920.336.1398	Private, residential	<ul style="list-style-type: none"> Location is in the backyard of the residence. As a courtesy, call owner or leave message a day or two prior to accessing the monument. Ring bell at time of work to announce visit, before walking around to back of house.
OU3-04A	2281 Lost Dauphin Rd. DePere	David & Lyne Fischer P: 920.336.2433	Private, residential	<ul style="list-style-type: none"> Location is in the backyard of the residence. As a courtesy, call owner or leave message a day or two prior to accessing the monument. Ring bell at time of work to announce visit, before walking around to back of house.
OU3-05B	2378 Old Plank Rd. Town of Rockland	Arthur & Kay Sonneland P: 920.336.1295	Private, residential	<ul style="list-style-type: none"> Location is in the backyard of the residence. As a courtesy, call owner or leave message a day or two prior to accessing the monument. Ring bell at time of work to announce visit, before walking around to back of house.
OU3-05A	453 N. Olden Glen Rd. DePere	Paul & Kaye Freischlag P: 920.338.0439	Private, residential	<ul style="list-style-type: none"> Location is in the backyard of the residence. As a courtesy, call owner or leave message a day or two prior to accessing the monument. Ring bell at time of work to announce visit, before walking around to back of house.
OU3-06	Stewart St. DePere	St. Norbert College John Barnes Director of Facilities P: 920.403.3255	Private, but contiguous with City right-of-way	<ul style="list-style-type: none"> As a courtesy, call or leave message with owner before doing work on the property.
OU3-07	Bomier Boat Launch DePere	City of DePere Jerry Perkofski Parks Director P: 920.339.4065	Public	<ul style="list-style-type: none"> None
OU3-08	DePere Lock and Dam	USACE Robert Stanik Chief, Fox River Sub-	Public agency, but with restricted access	<ul style="list-style-type: none"> Location is inside a locked gate. Crew can call and stop at Mr. Stanik's office during business hours to sign out a key (1008 Augustine St., Kaukauna.)

		Office P: 920.766.3531		
CEDPL	DePere Lock and Dam	USACE Robert Stanik Chief, Fox River Sub-Office P: 920.766.3531	Public agency, but with restricted access	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU3. Location is inside a locked gate. Crew can call and stop at Mr. Stanik's office during business hours to sign out a key (1008 Augustine St., Kaukauna.)
CEDPL7	DePere Lock and Dam	USACE Robert Stanik Chief, Fox River Sub-Office P: 920.766.3531	Public agency, but with restricted access	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU3. Location is inside a locked gate. Crew can call and stop at Mr. Stanik's office during business hours to sign out a key (1008 Augustine St., Kaukauna.)
75-33	DePere Lock and Dam	USACE Robert Stanik Chief, Fox River Sub-Office P: 920.766.3531	Public agency, but with restricted access	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU3. Location is inside a locked gate. Crew can call and stop at Mr. Stanik's office during business hours to sign out a key (1008 Augustine St., Kaukauna.)
OU4-01	Brown County Fairgrounds @ South Boat Launch	City of DePere Jerry Perkofski Parks Director P: 920.339.4065	Public	<ul style="list-style-type: none"> None
93-1	Fox Point Boat Launch		Public	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU4. Location is within the City park.
OU4-02	Fox Point Boat Launch	City of DePere Jerry Perkofski Parks Director P: 920.339.4065	Public	<ul style="list-style-type: none"> None
OU4-03	Globe Ave. Ashwaubenon	Pioneer Metal Finishing Ted Verhaagh Engineering Manager P: 920.884.1647	Private, industrial	<ul style="list-style-type: none"> As a courtesy, call owner and leave message a day or two in advance of any work on the property.
OU4-04	Fox River Bike Trail @ 2222 Riverside Dr. Allouez	Mariner Supper Club Dave Cowles	Private, but contiguous with public bike trail	<ul style="list-style-type: none"> None
OU4-05	Right-of-way Fox River Bike Trail St. Francis Park Allouez	Brown County Doug Hartman P: 920.434.2824	Public	<ul style="list-style-type: none"> None
OU4-06	Leicht – South Terminal 1401 St. Street Green Bay	Leicht Inc. Carl Thiem, President P: 920.432.8632	Private, industrial	<ul style="list-style-type: none"> Sign in at front desk prior to any on-site work.
75-23	South of Brogan property and former RR ROW @ Porlier St.		Public	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU4. Location is unrestricted, and is accessible via contiguous bike trail and greenspace.
OU4-07	Brogan Property (between Lawe St. and Cass St.)	John Brogan c/o Wisconsin Converting P: 920.437.6400	Private, but held in trust for public use and contiguous with bike path	<ul style="list-style-type: none"> None
OU4-08	Brownfield site along State St., north of Mason St. bridge	City of Green Bay Tom Giese DPW P: 920.448.3111	Public, although currently undeveloped and unused	<ul style="list-style-type: none"> None
OU4-09	Walking path along river @ end of Cherry St.	City of Green Bay Tom Giese DPW P: 920.448.3111	Public	<ul style="list-style-type: none"> None
OU4-10	Formerly Leicht – North Dock Dousman St. @ river	Western Lime Mike Nast P: 262.334.3005	Private, industrial	<ul style="list-style-type: none"> Call local Western Lime contact person before entering the site to work: Scott Sipiorski, 920.437.4054.

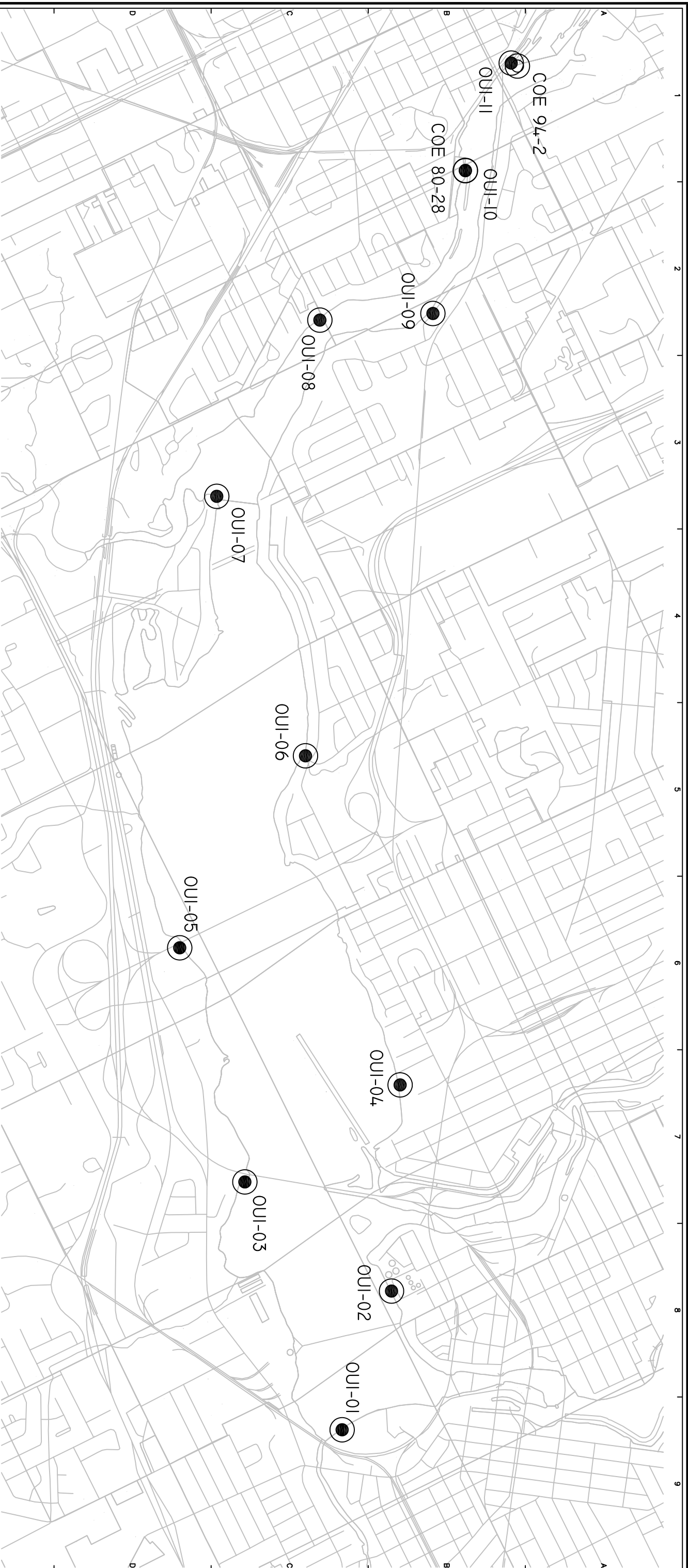
OU4-11	Walking path along river @ East River, behind WPSC building	Wisconsin Public Service Corp. Douglas Mathys P: 920.448.3111	Private, but contiguous with public walking path and greenspace	<ul style="list-style-type: none"> Call Doug Mathys any time that crews will be working on the property.
73-1	Amoco Terminal 1124 N. Broadway Green Bay		Private, industrial	<ul style="list-style-type: none"> This is an existing U.S. Army Corps of Engineers control point in OU4. Location is on the waterfront, but requires access through the bulk terminal. Stop at the office and ask for someone with a key to the back gate.
OU4-12	1400 Bylsby Ave. Green Bay	Fox River Dock Company, Inc. Bruce Riutta Vice President P: 920.432.0833	Private, industrial	<ul style="list-style-type: none"> Call before entering site to work: Craig, 920.432.0833.
OU4-13	Green Bay Boat Ramp	Green Bay Metropolitan Sanitary District Mike Pierner P: 920.438.1033	Public utility, but with unrestricted access	<ul style="list-style-type: none"> None



APPENDIX B

OPERABLE UNIT LOCATOR DRAWINGS

AND INDIVIDUAL MONUMENT TIE-SHEETS



LEGEND

- EXISTING USAGE OR NGS MONUMENT TO BE USED AS PART OF PROJECT NETWORK
- NEW MONUMENT TO BE USED AS PART OF PROJECT NETWORK
- 003-02

NOTES

1. BASE MAP IS WISCONSIN TRANSVERSE MERCATOR, NAD 83.

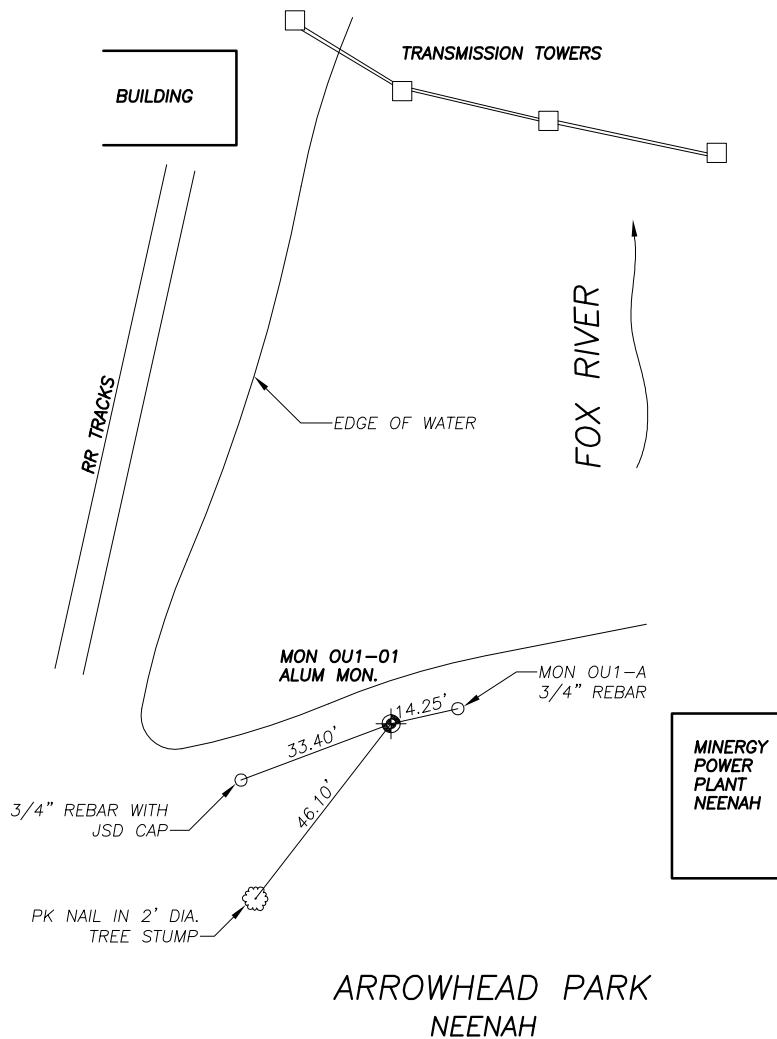
WDNR - FOX RIVER
PRE-DESIGN SURVEY

OU1 SURVEY MONUMENTS

C	FMS 11.03	ADJUST LOCATIONS TO SURVEYED COORDINATES, ADD COE POINTS				
B	FMS 11.03	AS-BUILT LOCATIONS OF FINAL NETWORK				
NO	DRAWN DATE	REVISION	CHKO	DATE	APVD	DATE



TIE SHEET



LEGEND

- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

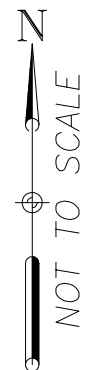
ARROWHEAD PARK
NEENAH

MON OU1-01

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°11'24.46407"N
133844.46	2369262.19	LONGITUDE	88°28'19.41159"W
		ELLIPSOID HGT.	625.66
		DYNAMIC HGT.	744.68
		NAVD88 ELEV.	744.81

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1358676.57	2106655.53

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



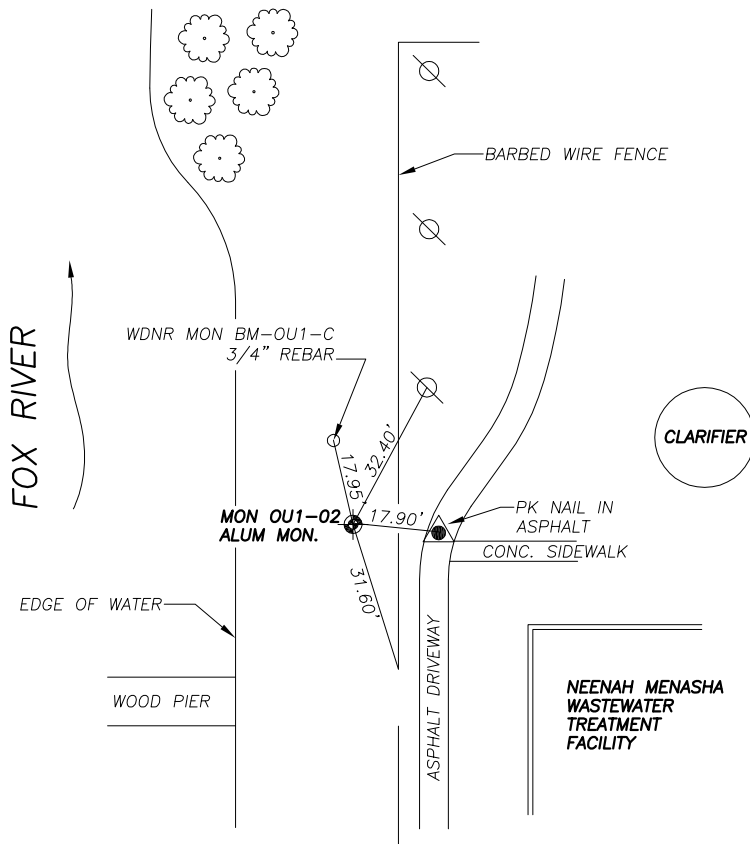
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU1-01
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JSD

Jenkins Survey & Design, Inc.
161 HORIZON DRIVE, STE 101
VERONA, WISCONSIN 53593
608-848-5060

TIE SHEET



LEGEND

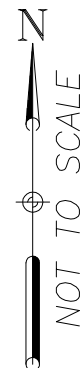
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-02

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°11'44.96142"N
135959.84	2371346.75	LONGITUDE	88°27'50.25802"W
		ELLIPSOID HGT.	623.65
		DYNAMIC HGT.	742.64
		NAVD88 ELEV.	742.77

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1360791.00	2108740.10

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



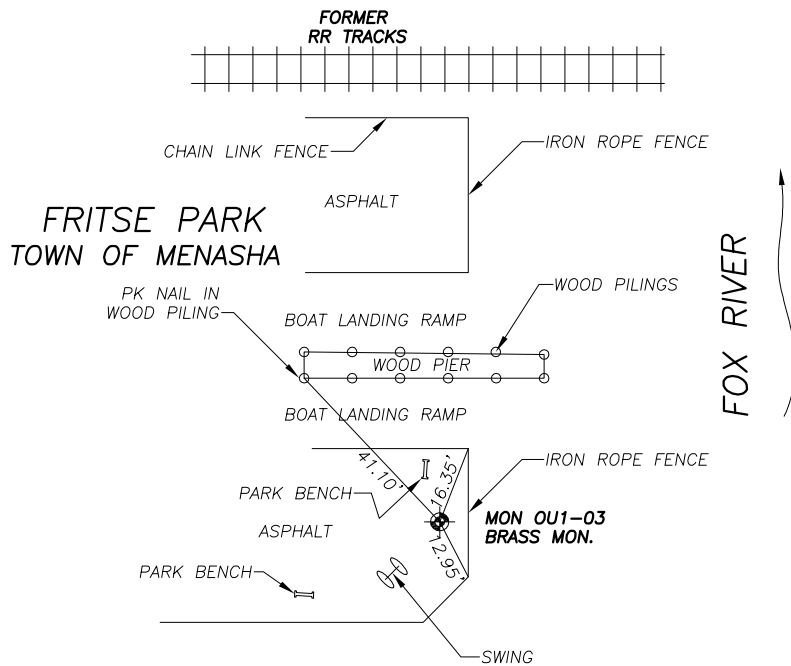
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU1-02



Jenkins Survey & Design, Inc.
161 HORIZON DRIVE, STE 101
VERONA, WISCONSIN 53593
608-848-5060

TIE SHEET



LEGEND

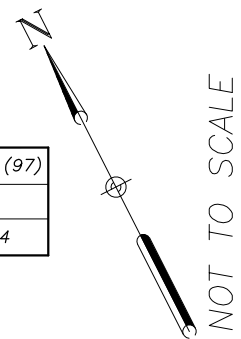
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- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-03

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°12'17.32353"N
139204.55	2369595.99	LONGITUDE	88°28'13.44567"W
		ELLIPSOID HGT.	622.13
		DYNAMIC HGT.	741.14
		NAVD88 ELEV.	741.27

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1364035.37	2106990.44

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



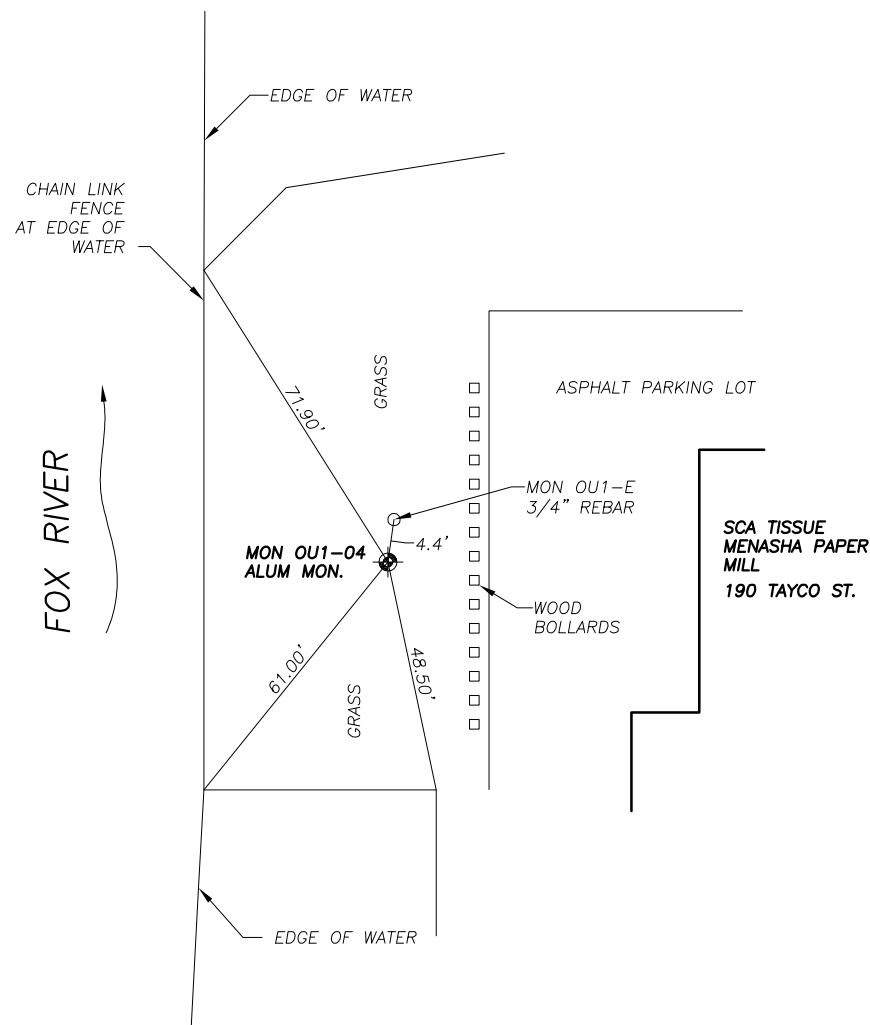
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU1-03

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608-848-5060

TIE SHEET



LEGEND

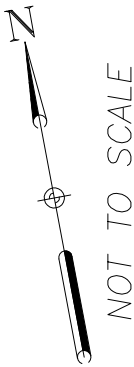
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- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
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- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-04

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°12'21.09383"N
139655.77	2373260.52	LONGITUDE	88°27'23.03051"W
		ELLIPSOID HGT.	632.10
		DYNAMIC HGT.	751.08
		NAVD88 ELEV.	751.21

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1364485.68	2110654.26

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

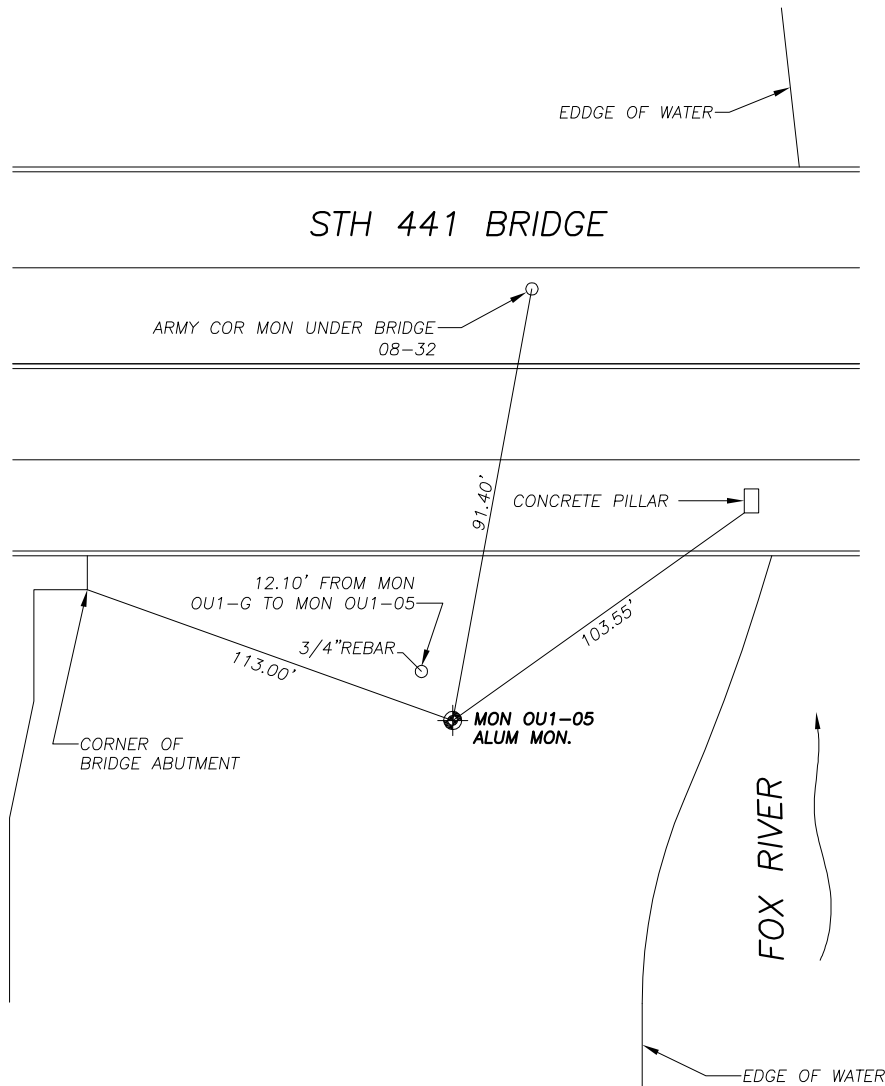


LOWER FOX RIVER
MAPPING AND MONUMENTATION PROJECT

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LEGEND

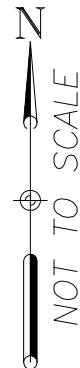
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- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-05

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°13'04.91990"N
144040.46	2370400.07	LONGITUDE	88°28'01.15593"W
		ELLIPSOID HGT.	632.61
		DYNAMIC HGT.	751.61
		NAVD88 ELEV.	751.74

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1368870.02	2107795.41

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



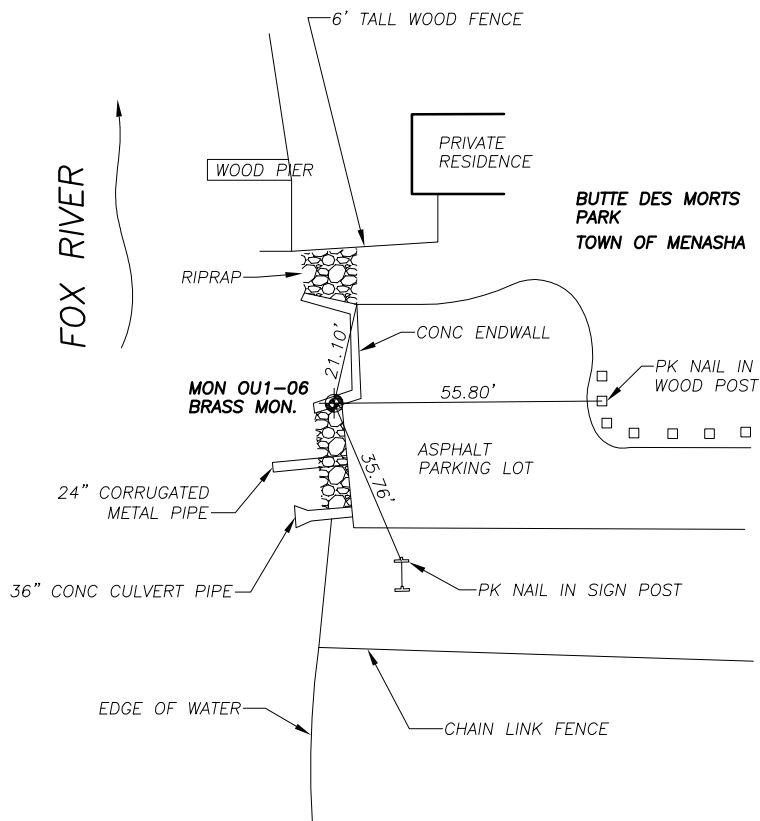
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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LEGEND

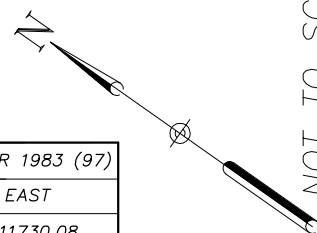
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- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-06

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°13'28.26223"N
146479.33	2374335.08	LONGITUDE	88°27'06.49551"W
		ELLIPSOID HGT.	621.34
		DYNAMIC HGT.	740.31
		NAVD88 ELEV.	740.44

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1371307.50	2111730.08



NOT TO SCALE

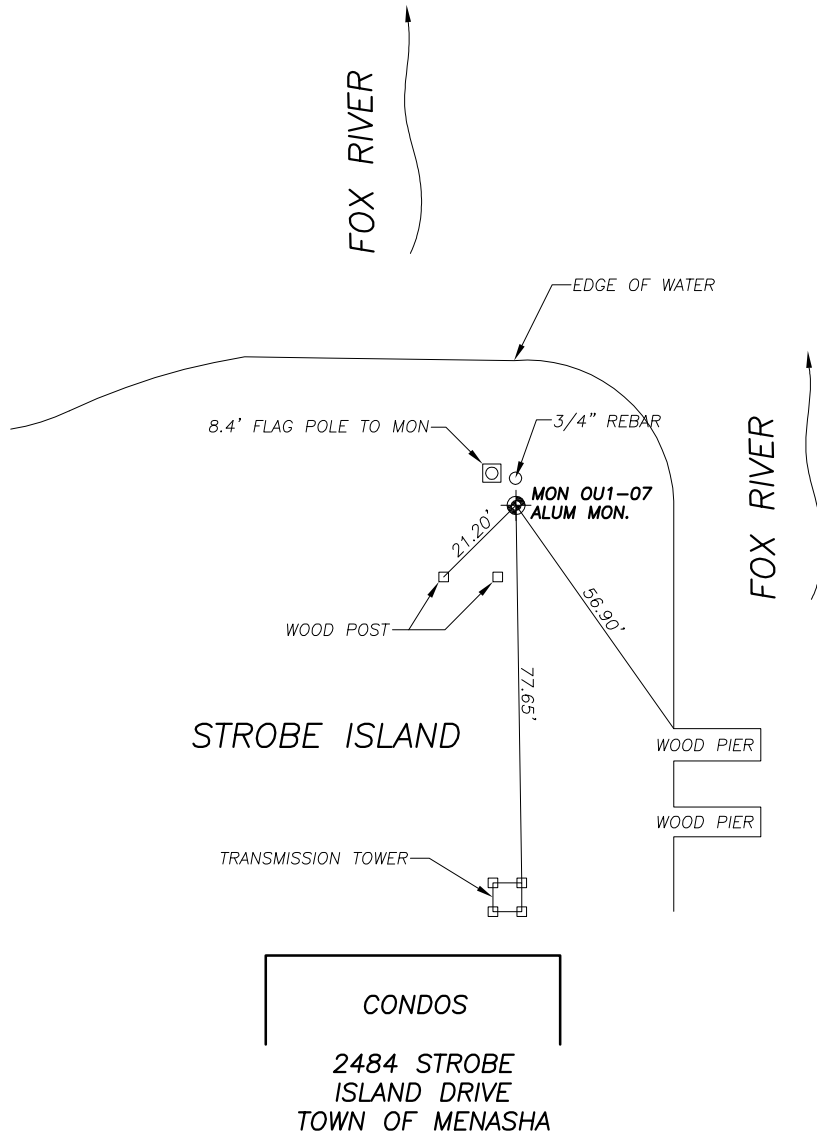
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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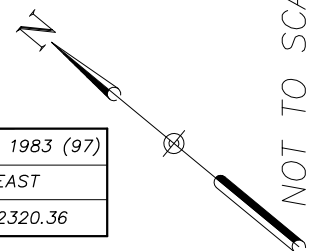
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- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-07

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°14'22.45446"N
151979.39	2374924.31	LONGITUDE	88°26'56.96291"W
		ELLIPSOID HGT.	622.17
		DYNAMIC HGT.	741.13
		NAVD88 ELEV.	741.26

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1376806.26	2112320.36



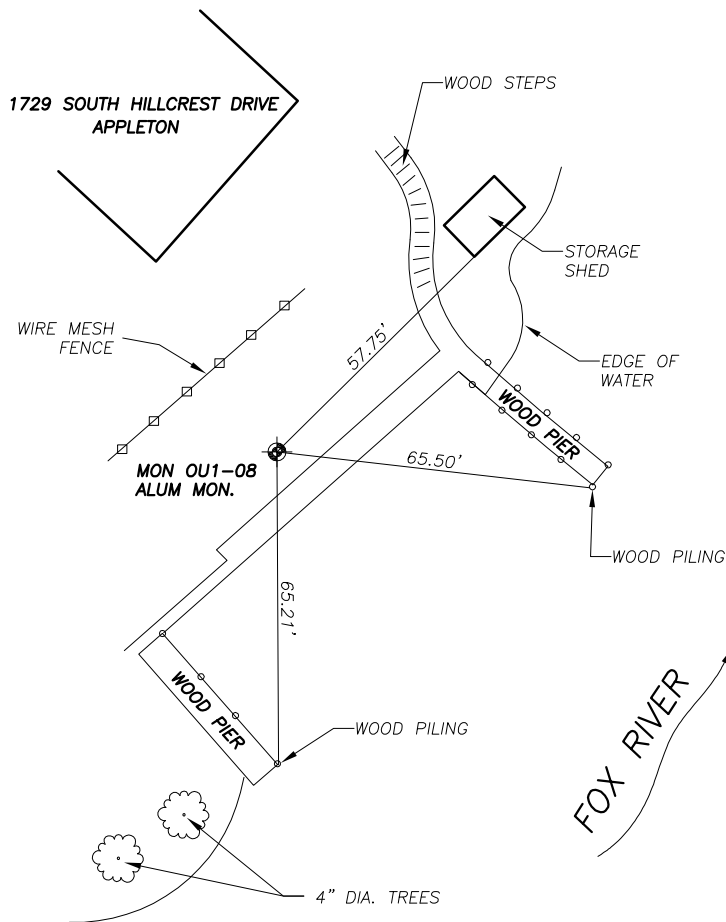
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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TIE SHEET



LEGEND

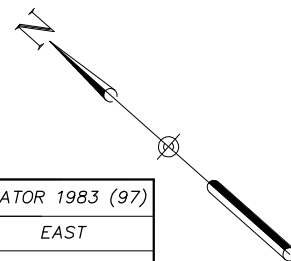
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- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-08

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°14'44.95102"N
154322.89	2378310.46	LONGITUDE	88°26'09.83895"W
		ELLIPSOID HGT.	623.17
		DYNAMIC HGT.	742.09
		NAVD88 ELEV.	742.22

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1379148.54	2115706.30



NOT TO SCALE

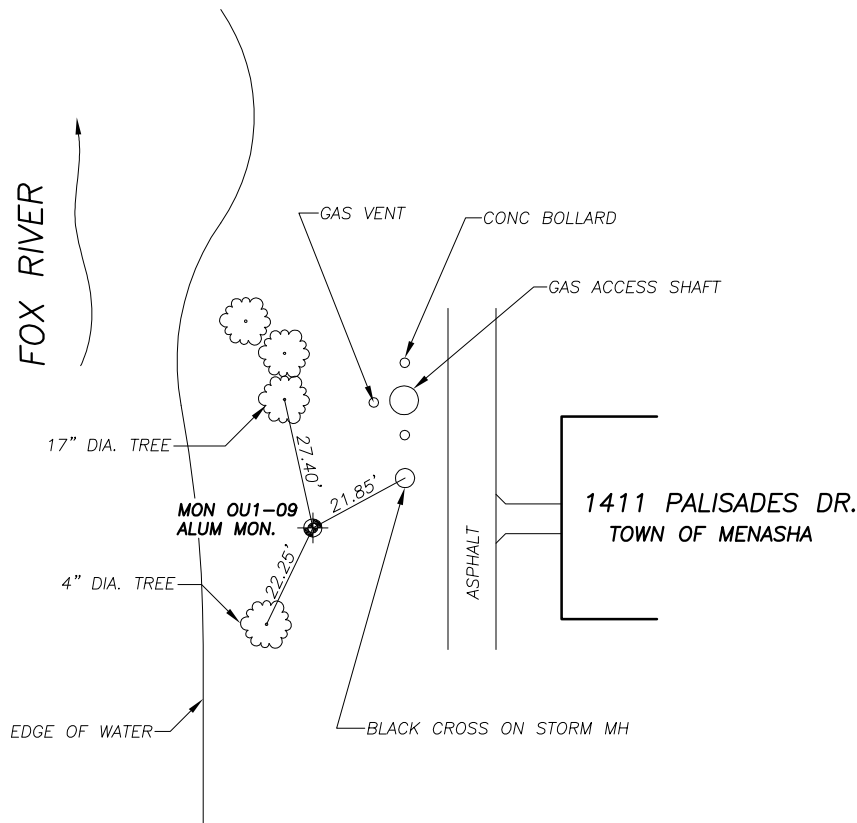
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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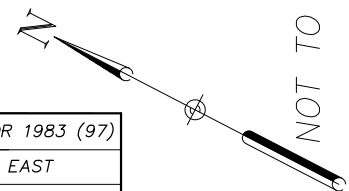
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- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-09

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°14'36.23244"N
153480.83	2380433.30	LONGITUDE	88°25'40.90567"W
		ELLIPSOID HGT.	622.18
		DYNAMIC HGT.	741.08
		NAVD88 ELEV.	741.21

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1378306.21	2117828.51



NOT TO SCALE

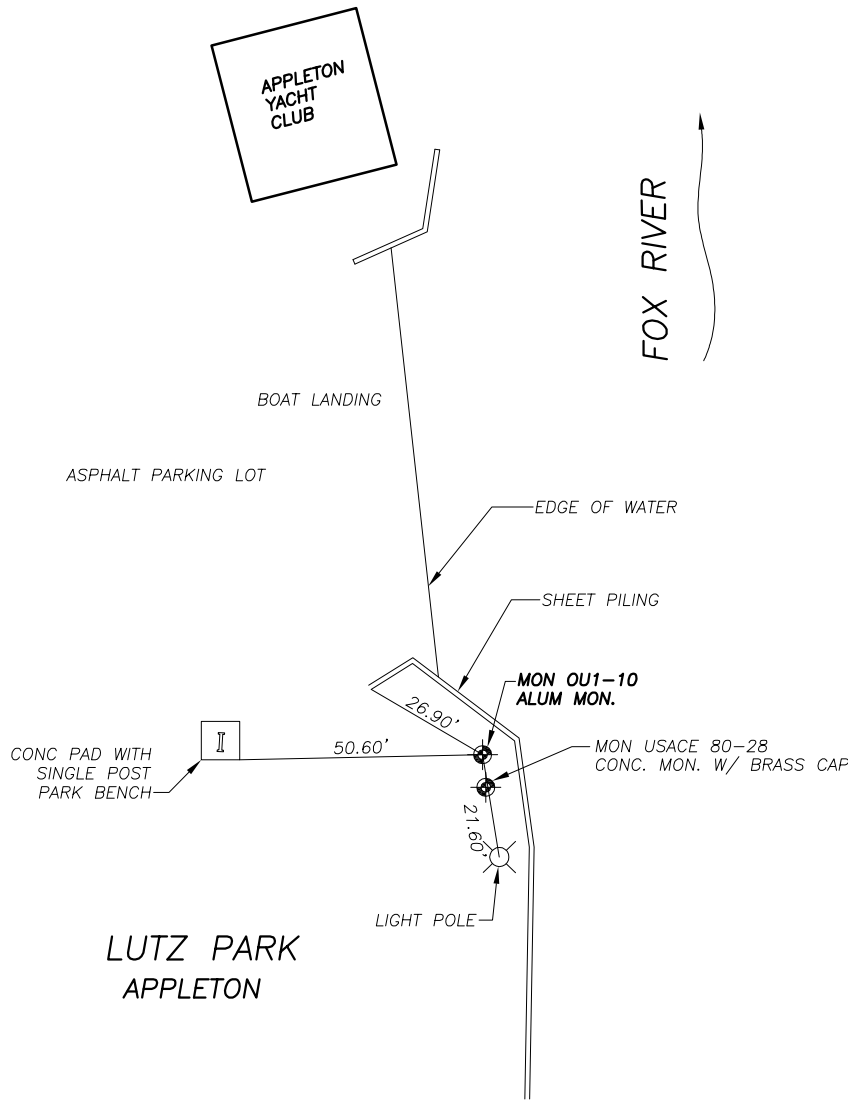
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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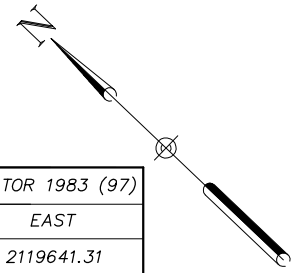
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- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
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- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-10

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°14'58.97948"N
155819.93	2382245.98	LONGITUDE	88°25'15.38481"W
		ELLIPSOID HGT.	619.83
		DYNAMIC HGT.	738.71
		NAVD88 ELEV.	738.84

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1380644.44	2119641.31

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



NOT TO SCALE

LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU1-10
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LEGEND

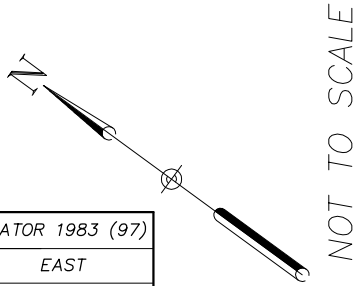
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU1-11

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°15'14.16276"N
157391.93	2383998.76	LONGITUDE	88°24'50.88703"W
		ELLIPSOID HGT.	622.85
		DYNAMIC HGT.	741.72
		NAVD88 ELEV.	741.85

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1382215.75	2121394.07

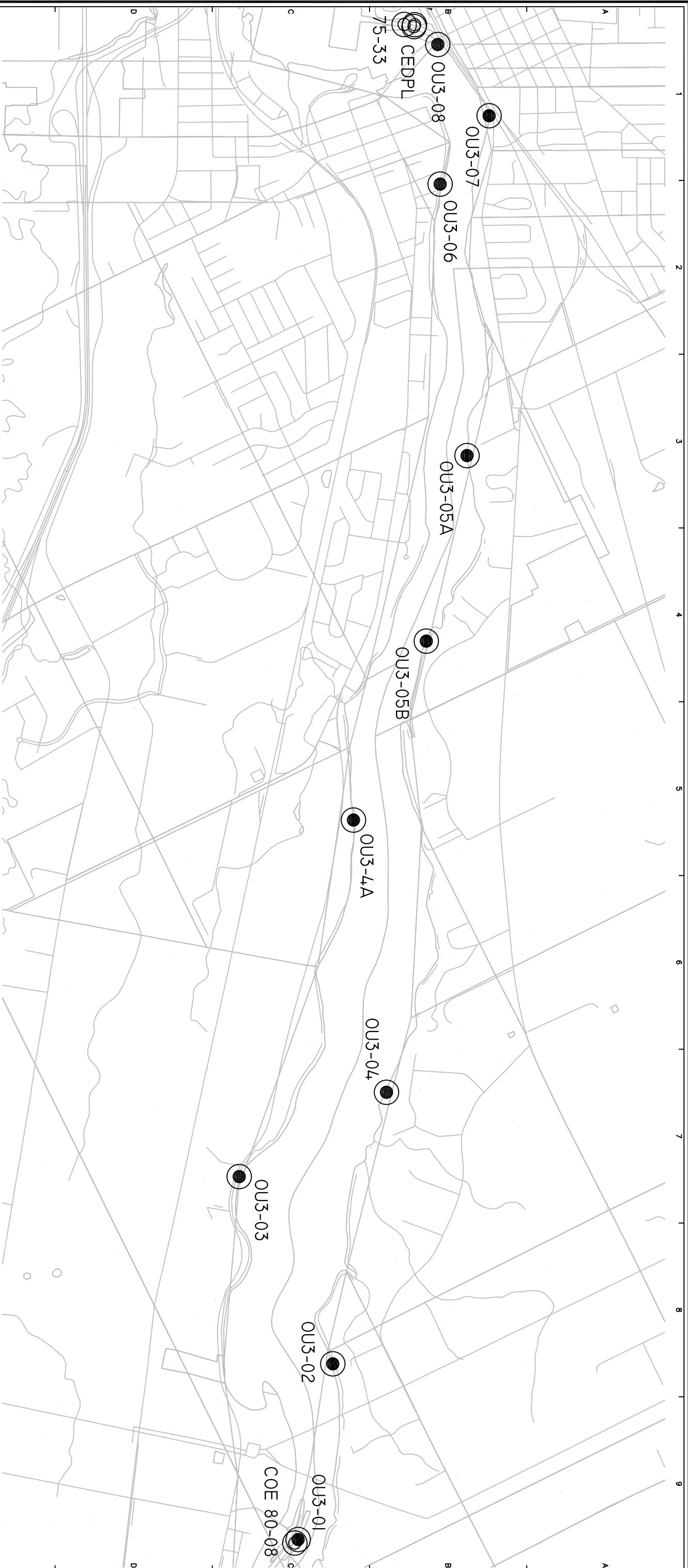
NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



LOWER FOX RIVER
MAPPING AND MONUMENTATION PROJECT

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J:\Projects\



LEGEND




NEW MONUMENT TO BE USED AS PART
OF PROJECT NETWORK

NOTES

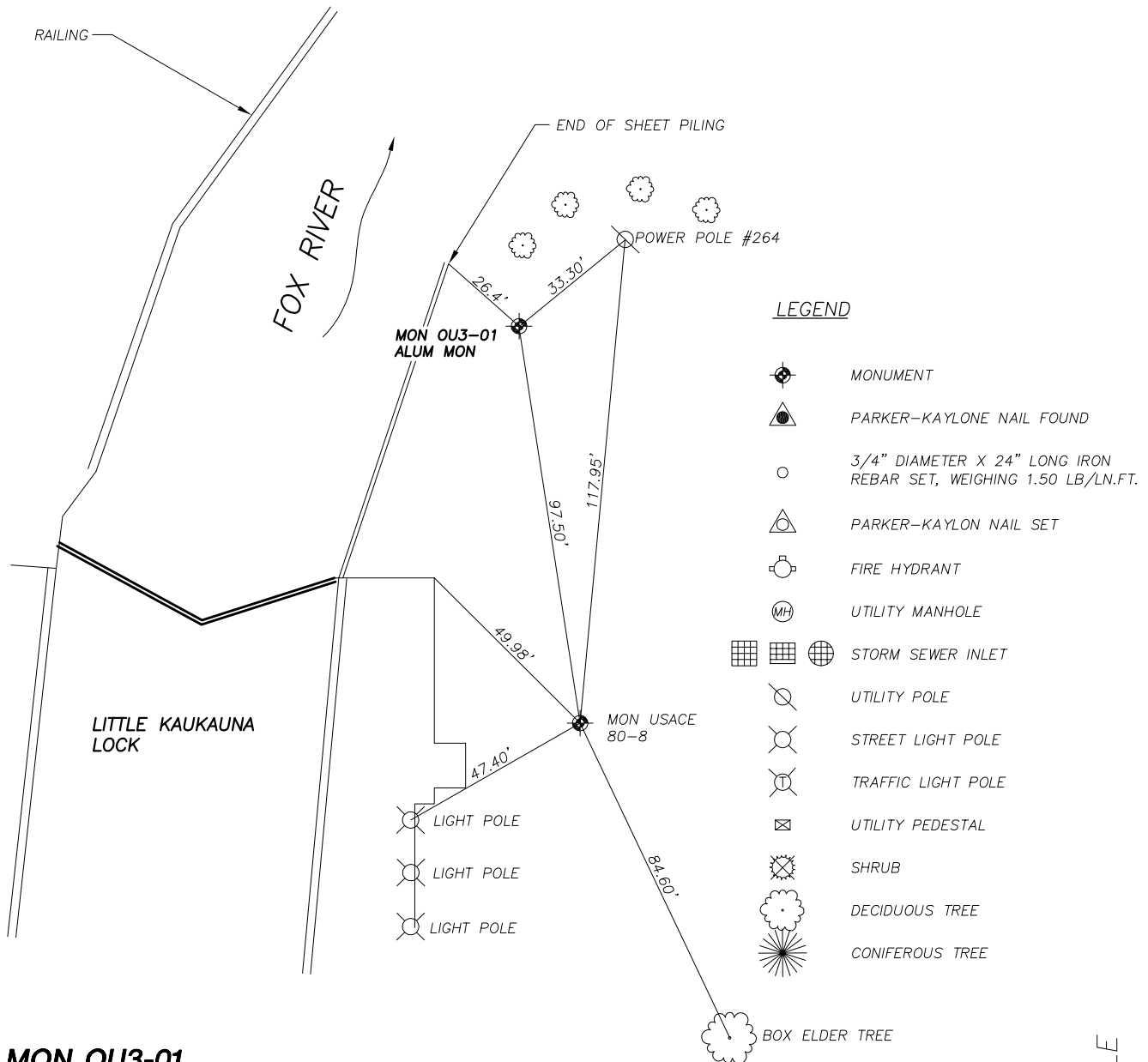
1. BASE MAP IS WISCONSIN TRANSVERSE MERCATOR, NAD 83.



					
C	FMS	11.03	ADJUST LOCATIONS TO SURVEYED COORDINATES, ADD COE POINTS		
B	FMS	11.03	AS-BUILT LOCATIONS OF FINAL NETWORK		
A	FMS	11.03	ISSUE FOR INHOUSE USE		
	NO.	DRAWN DATE	REVISION		
		CHKD DATE	APPVD DATE		
				WDNR - FOX RIVER PRE-DESIGN SURVEY WISC 15933	
CURRENT DATE JUNE 2003				OUI3 SURVEY MONUMENTS	
				DRAWING NO.	FIGURE 1
				REVISION	C



TIE SHEET

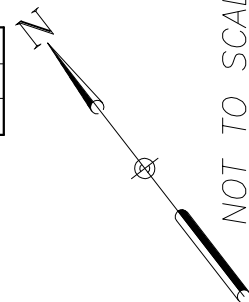


MON OU3-01

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°22'40.84405"N
204239.37	2459202.26	LONGITUDE	88°07'23.02528"W
		ELLIPSOID HGT.	480.21
		DYNAMIC HGT.	598.79
		NAVD88 ELEV.	598.87

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1429040.48	2196595.70



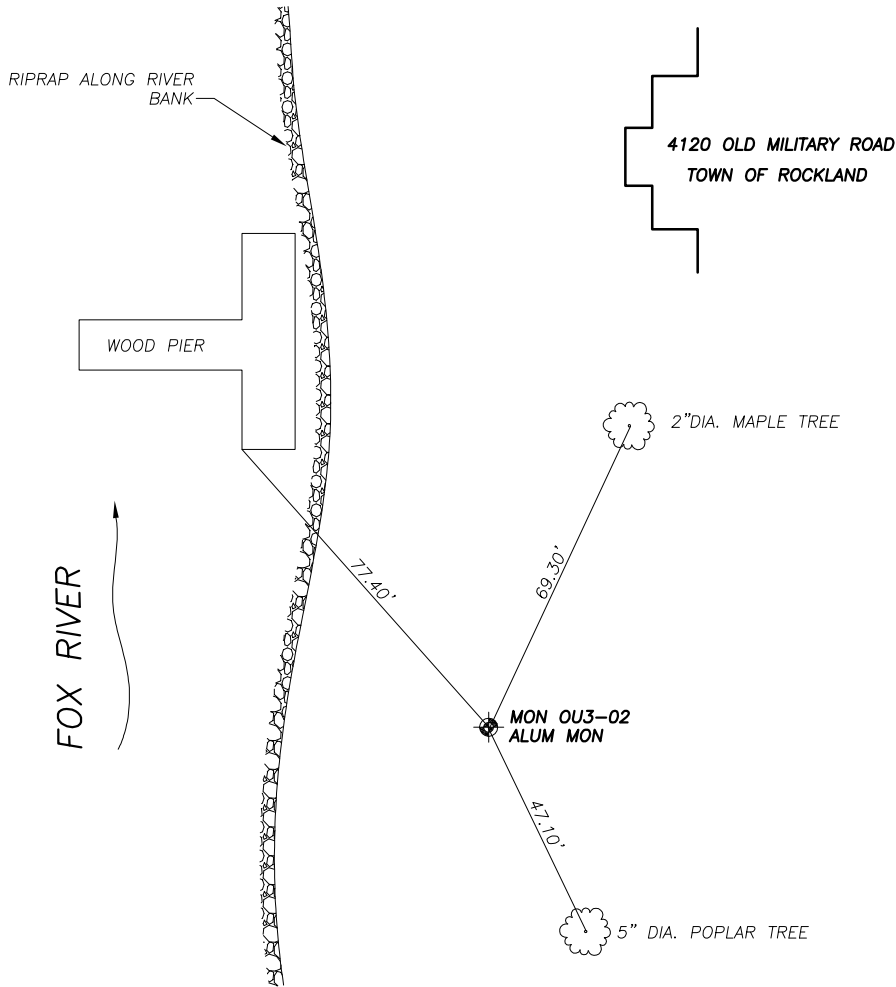
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LEGEND

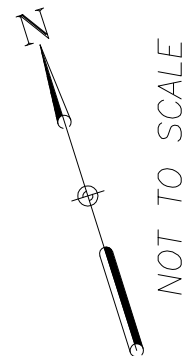
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
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- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-02

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°23'09.11683"N
207152.52	2461330.93	LONGITUDE	88°06'52.79281"W
		ELLIPSOID HGT.	474.48
		DYNAMIC HGT.	593.05
		NAVD88 ELEV.	593.13

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1431952.92	2198724.73



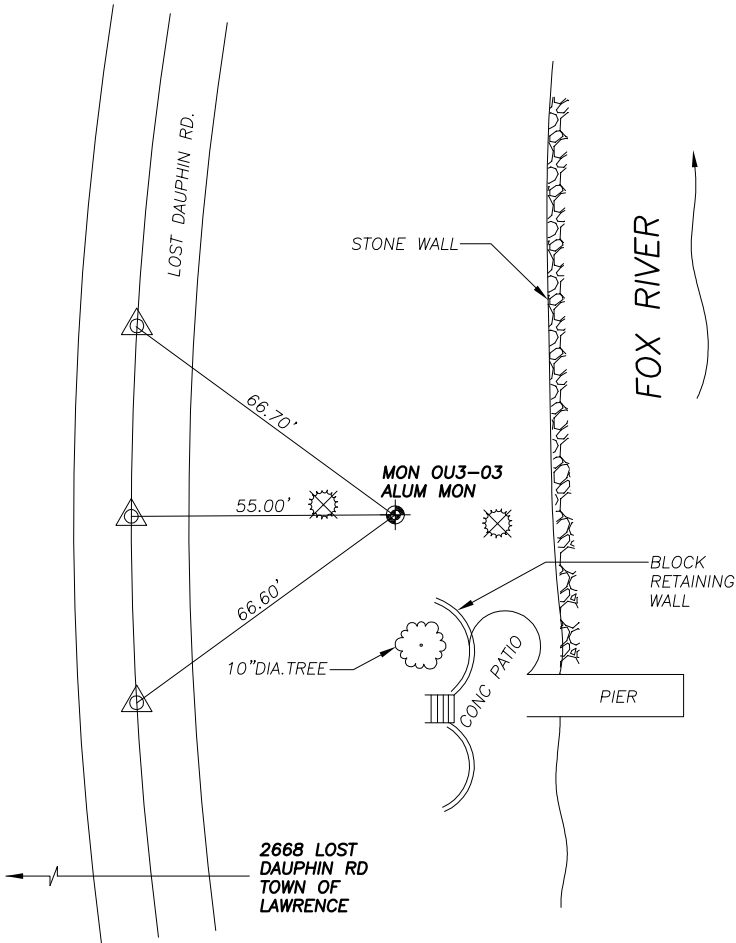
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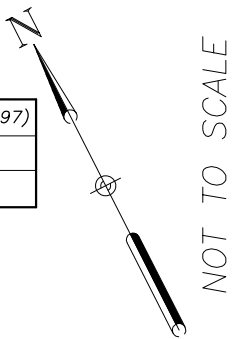
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- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-03

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°23'50.76803"N
211368.81	2461215.04	LONGITUDE	88°06'53.04032"W
		ELLIPSOID HGT.	475.39
		DYNAMIC HGT.	593.97
		NAVD88 ELEV.	594.05

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

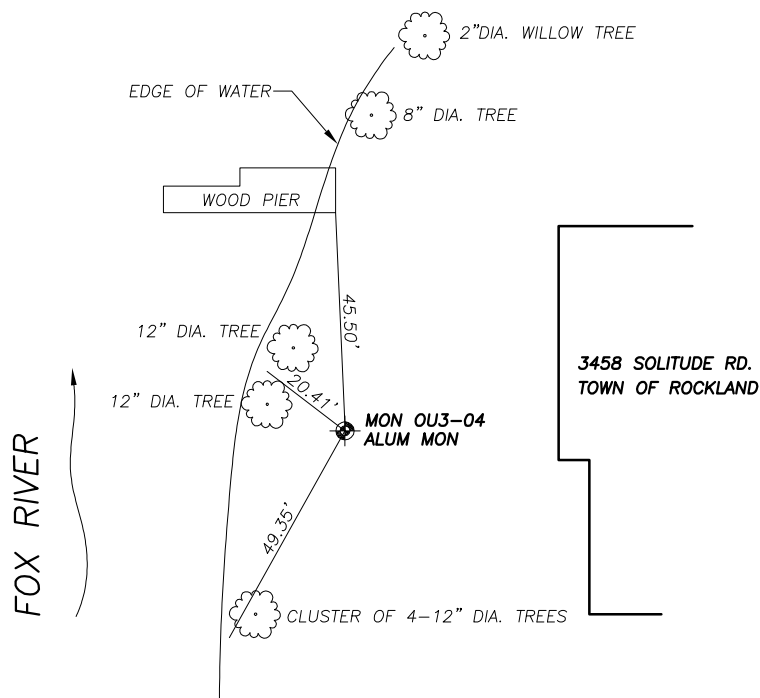
WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1436168.82	2198609.67



LOWER FOX RIVER
MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU3-03
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TIE SHEET



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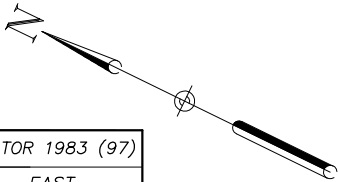
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- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
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- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-04

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°23'52.80540"N
211654.59	2464622.82	LONGITUDE	88°06'06.02455"W
		ELLIPSOID HGT.	471.48
		DYNAMIC HGT.	590.05
		NAVD88 ELEV.	590.13

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1436453.91	2202017.17



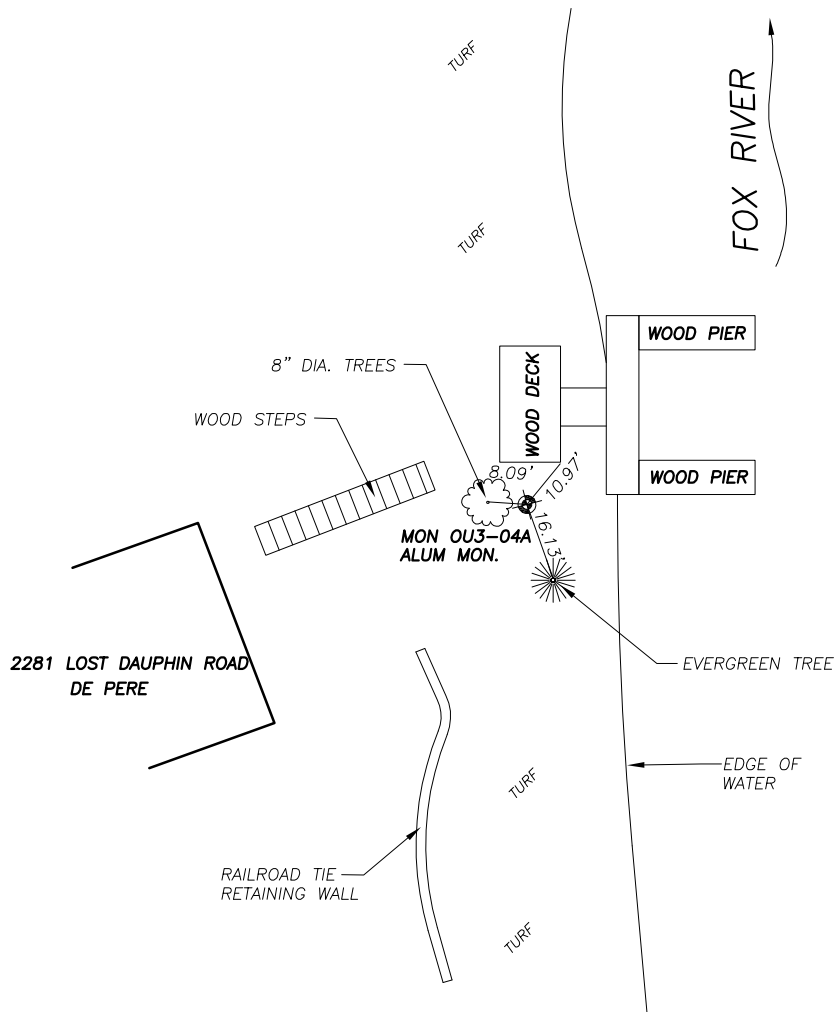
NOT TO SCALE

LOWER FOX RIVER
MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU3-04

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LEGEND

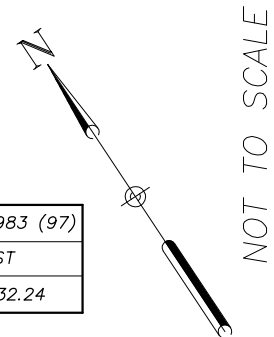
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- PARKER-KAYLONE NAIL FOUND
-
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-04A

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°24'44.26848"N
216907.63	2466337.05	LONGITUDE	88°05'40.72262"W
		ELLIPSOID HGT.	472.22
		DYNAMIC HGT.	590.79
		NAVD88 ELEV.	590.87

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1441706.15	2203732.24

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



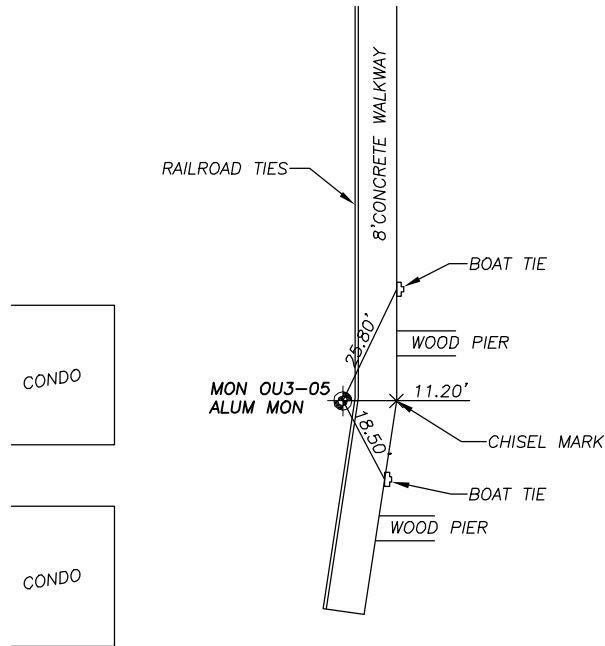
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU3-04A
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161 HORIZON DRIVE, STE 101
VERONA, WISCONSIN 53593
608-848-5060

TIE SHEET



LEGEND

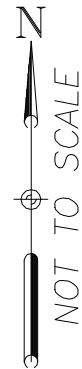
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- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-05

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°25'06.98411"N
219236.61	2467529.80	LONGITUDE	88°05'23.53999"W
		ELLIPSOID HGT.	473.33
		DYNAMIC HGT.	591.90
		NAVD88 ELEV.	591.98

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1444034.70	2204925.32

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

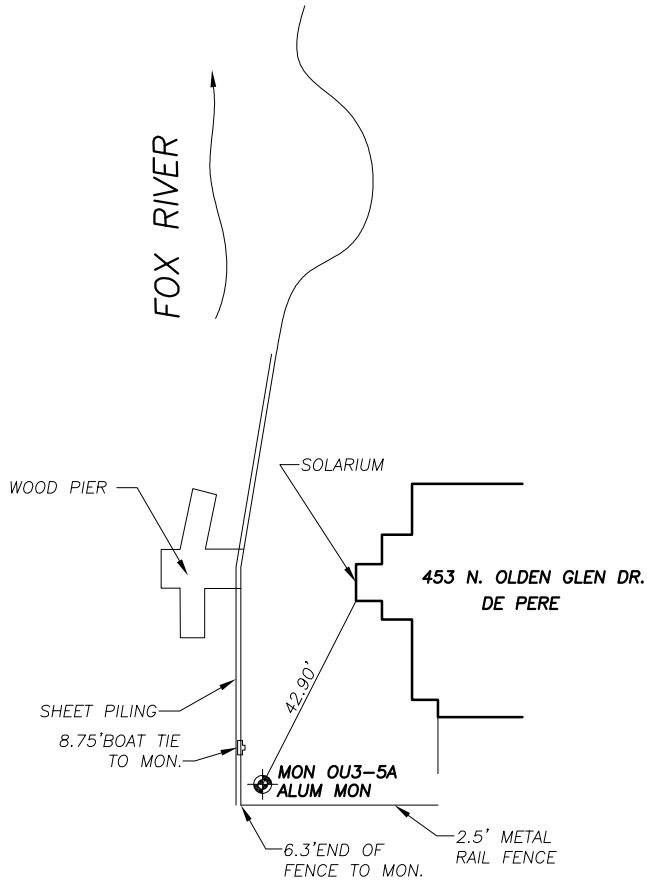
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TIE SHEET



LEGEND

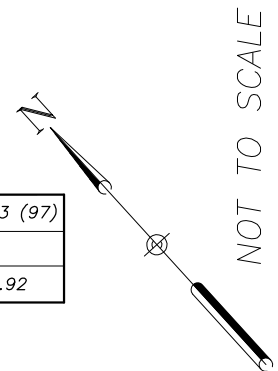
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
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- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-05A

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°25'39.23091"N
222597.13	2471513.13	LONGITUDE	88°04'27.57377"W
		ELLIPSOID HGT.	474.94
		DYNAMIC HGT.	593.51
		NAVD88 ELEV.	593.59

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1447394.19	2208908.92



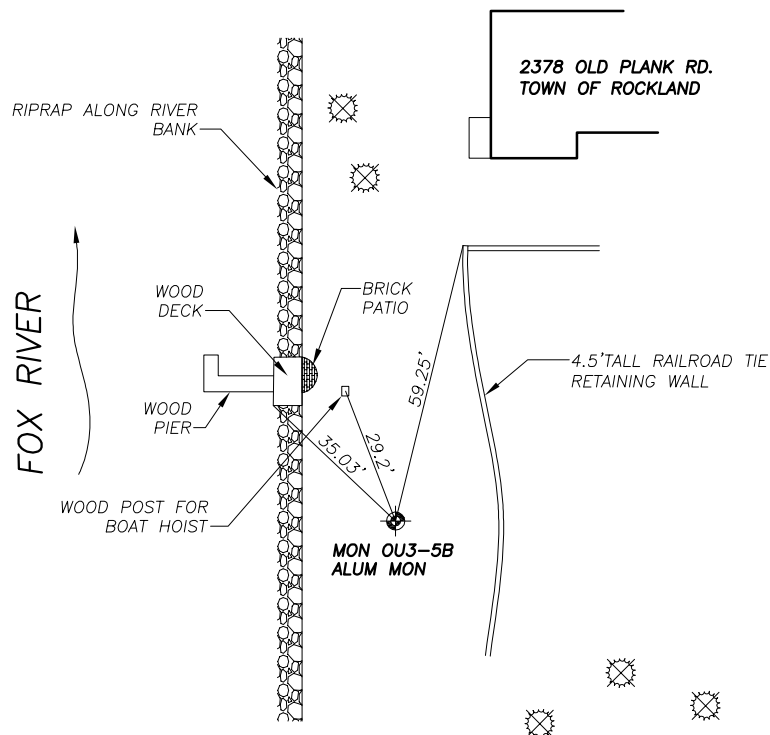
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU3-05A
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TIE SHEET



LEGEND

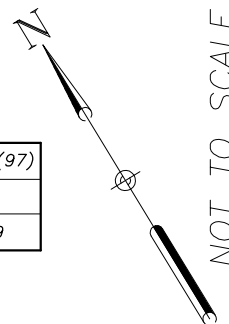
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-05B

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°25'09.74096"N
219554.99	2469190.16	LONGITUDE	88°05'00.56586"W
		ELLIPSOID HGT.	475.00
		DYNAMIC HGT.	593.57
		NAVD88 ELEV.	593.65

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1444352.74	2206585.59



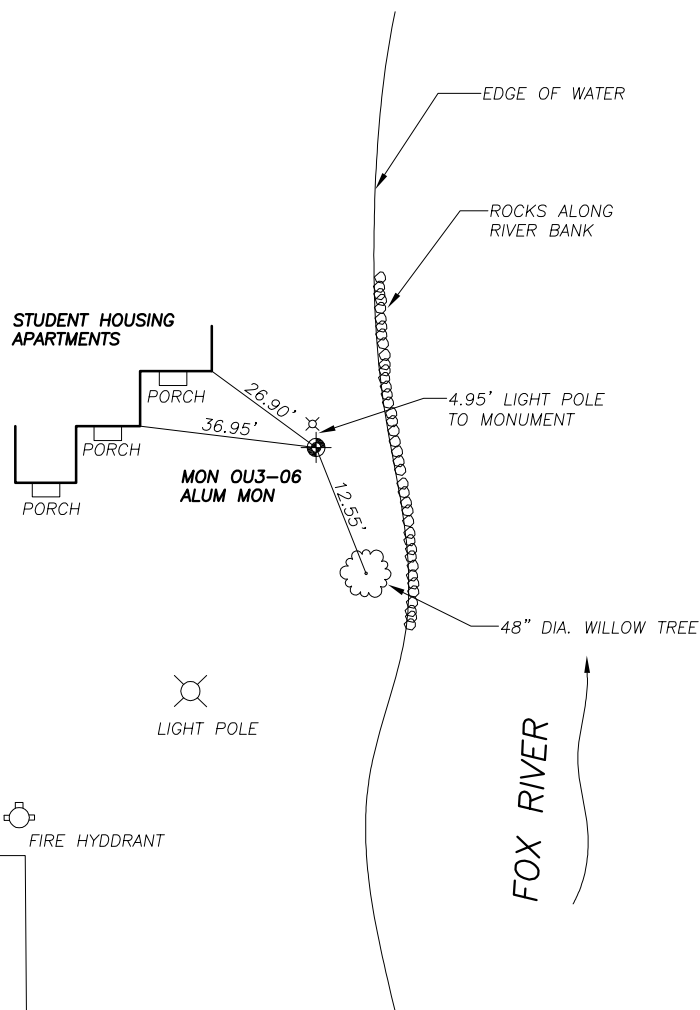
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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608-848-5060

TIE SHEET



LEGEND

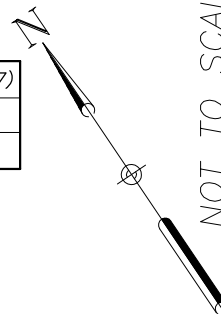
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- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-06

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°26'30.00771"N
227783.79	2473332.86	LONGITUDE	88°04'00.80270"W
		ELLIPSOID HGT.	473.69
		DYNAMIC HGT.	592.26
		NAVD88 ELEV.	592.34

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1452580.11	2210729.44



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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CHECKED BY: EAS

PROJECT NO: 03C1200

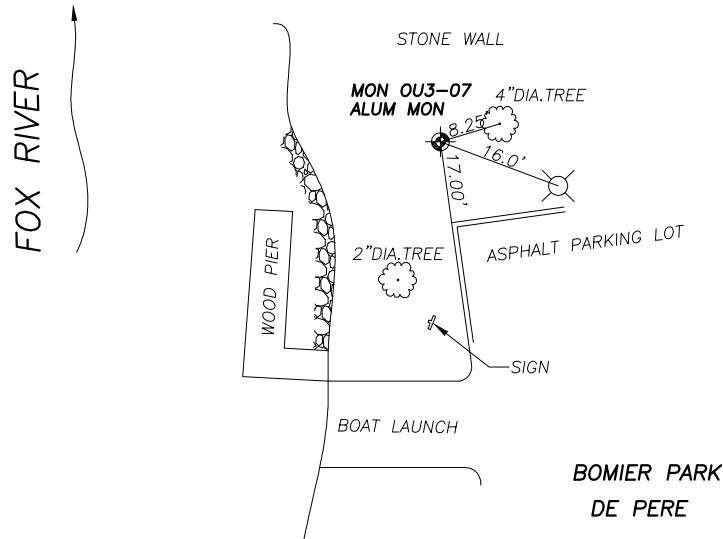
DATE: 12-04-03

MON NO. OU3-06

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LEGEND

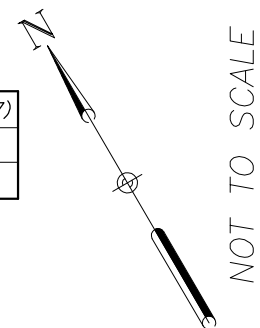
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
-
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-07

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°26'37.87201"N
228615.60	2474808.98	LONGITUDE	88°03'40.18811"W
		ELLIPSOID HGT.	473.00
		DYNAMIC HGT.	591.57
		NAVD88 ELEV.	591.65

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1453411.60	2212205.60



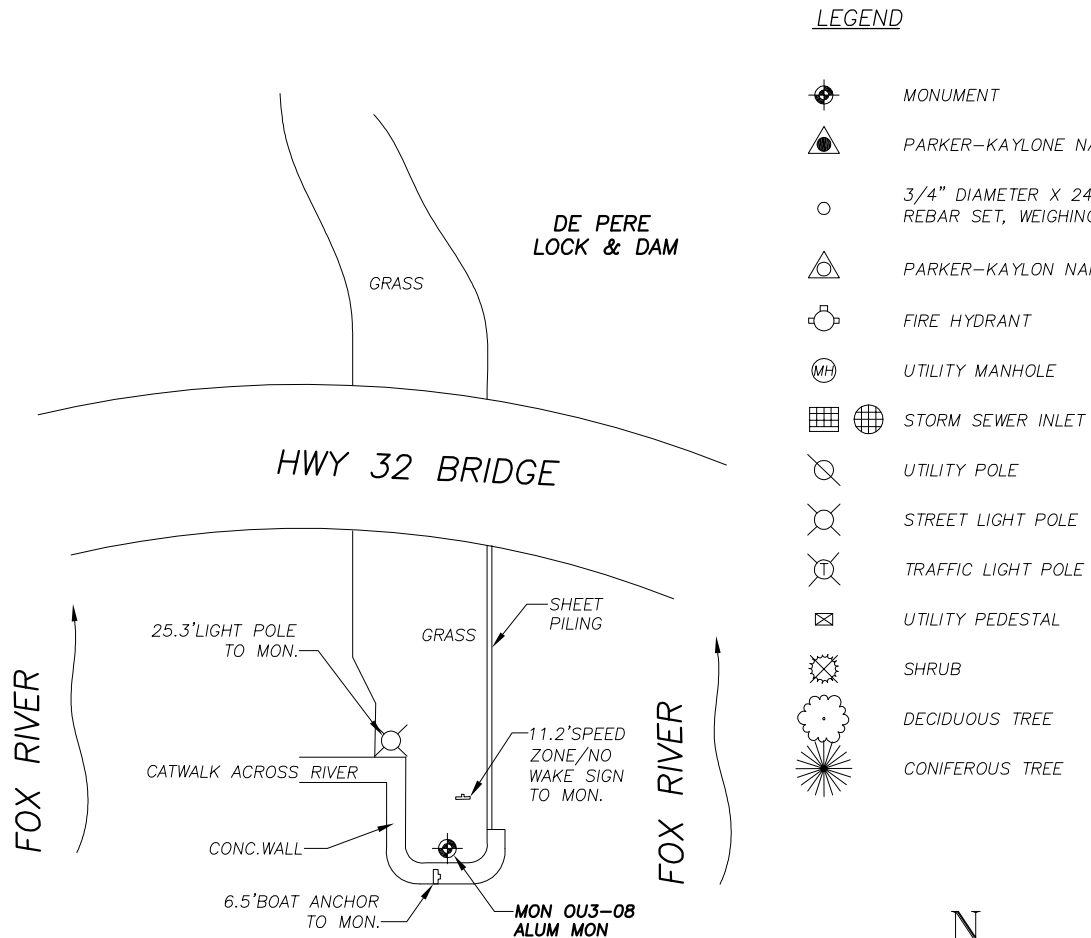
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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TIE SHEET



LEGEND

- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU3-08

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°26'55.10286"N
230353.09	2474477.85	LONGITUDE	88°03'44.17976"W
		ELLIPSOID HGT.	473.68
		DYNAMIC HGT.	592.26
		NAVD88 ELEV.	592.34

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1455149.01	2211874.80

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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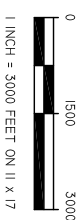


LEGEND


- EXISTING USAGE OR NGS MONUMENT TO BE
USED AS PART OF PROJECT NETWORK
- NEW MONUMENT TO BE USED AS PART
OF PROJECT NETWORK

NOTES

1. BASE MAP IS WISCONSIN TRANSVERSE MERCATOR, NAD 83.

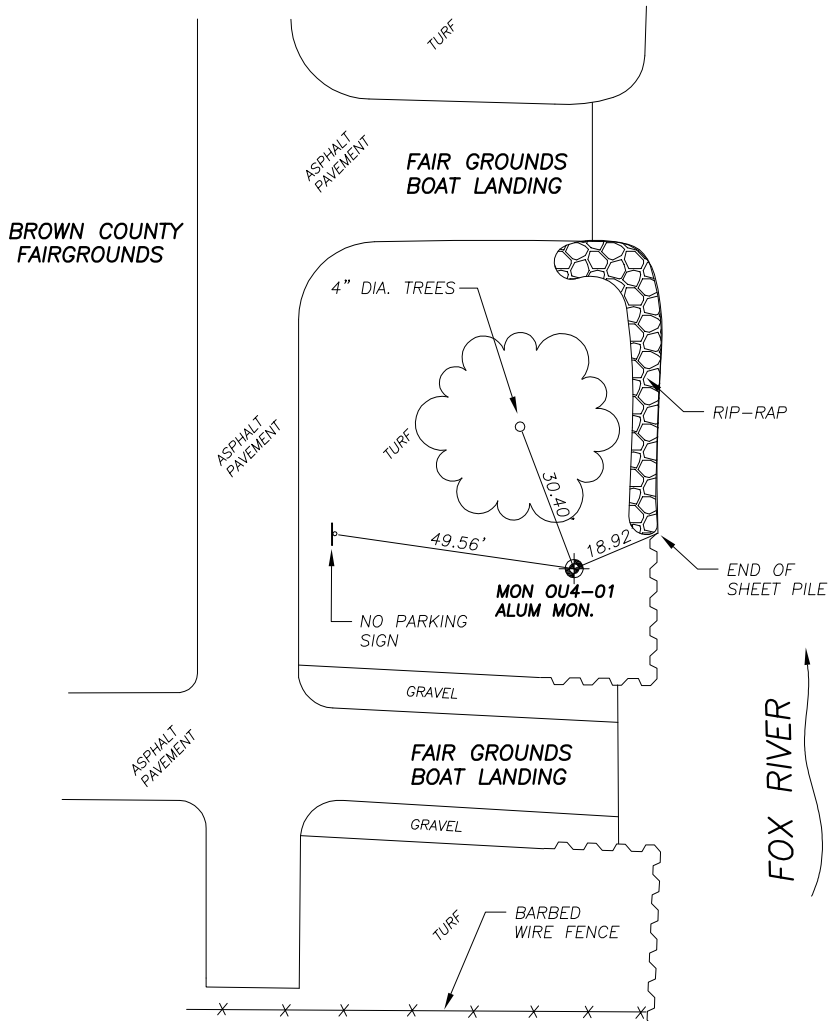


MAP NORTH

		WDNR - FOX RIVER PRE-DESIGN SURVEY WISC - 15953		OUA SURVEY MONUMENTS	
C	FMS 11.03	ADJUST LOCATIONS TO SURVEYED COORDINATES, ADD COE POINTS			
B	FMS 11.03	AS-BUILT LOCATIONS OF FINAL NETWORK			
A	FMS 11.03	ISSUE FOR INHOUSE USE			
NO	DRWN DATE	REVISION			
	CHKD DATE	APPRD DATE			
CURRENT DATE JUNE 2003			DRAWING NO. FIGURE 1		
			REVISION C		



TIE SHEET



LEGEND

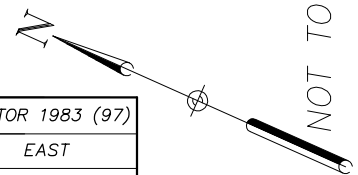
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU4-01

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°27'31.19306"N
233965.65	2472664.92	LONGITUDE	88°04'07.98060"W
		ELLIPSOID HGT.	466.84
		DYNAMIC HGT.	585.45
		NAVD88 ELEV.	585.52

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1458761.61	2210062.64



NOT TO SCALE

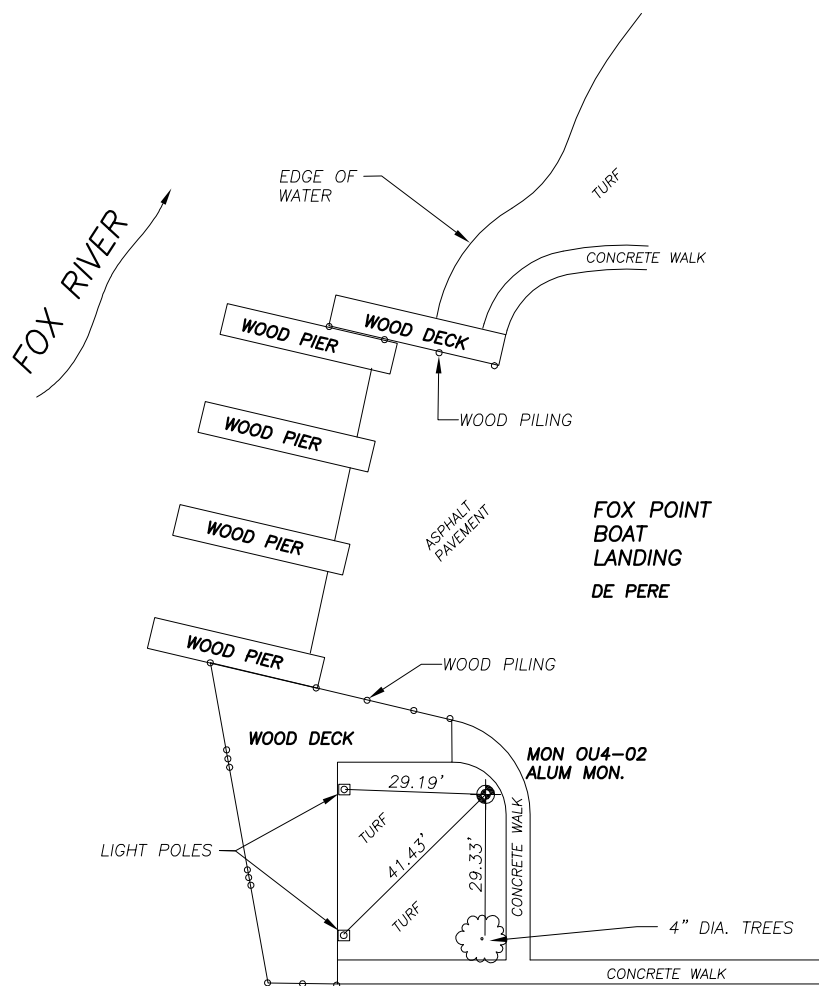
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

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TIE SHEET



LEGEND

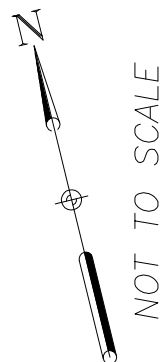
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
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- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU4-02

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°27'48.51961"N
235809.96	2476401.97	LONGITUDE	88°03'15.86023"W
		ELLIPSOID HGT.	465.40
		DYNAMIC HGT.	584.00
		NAVD88 ELEV.	584.07

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1460605.15	2213799.72

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



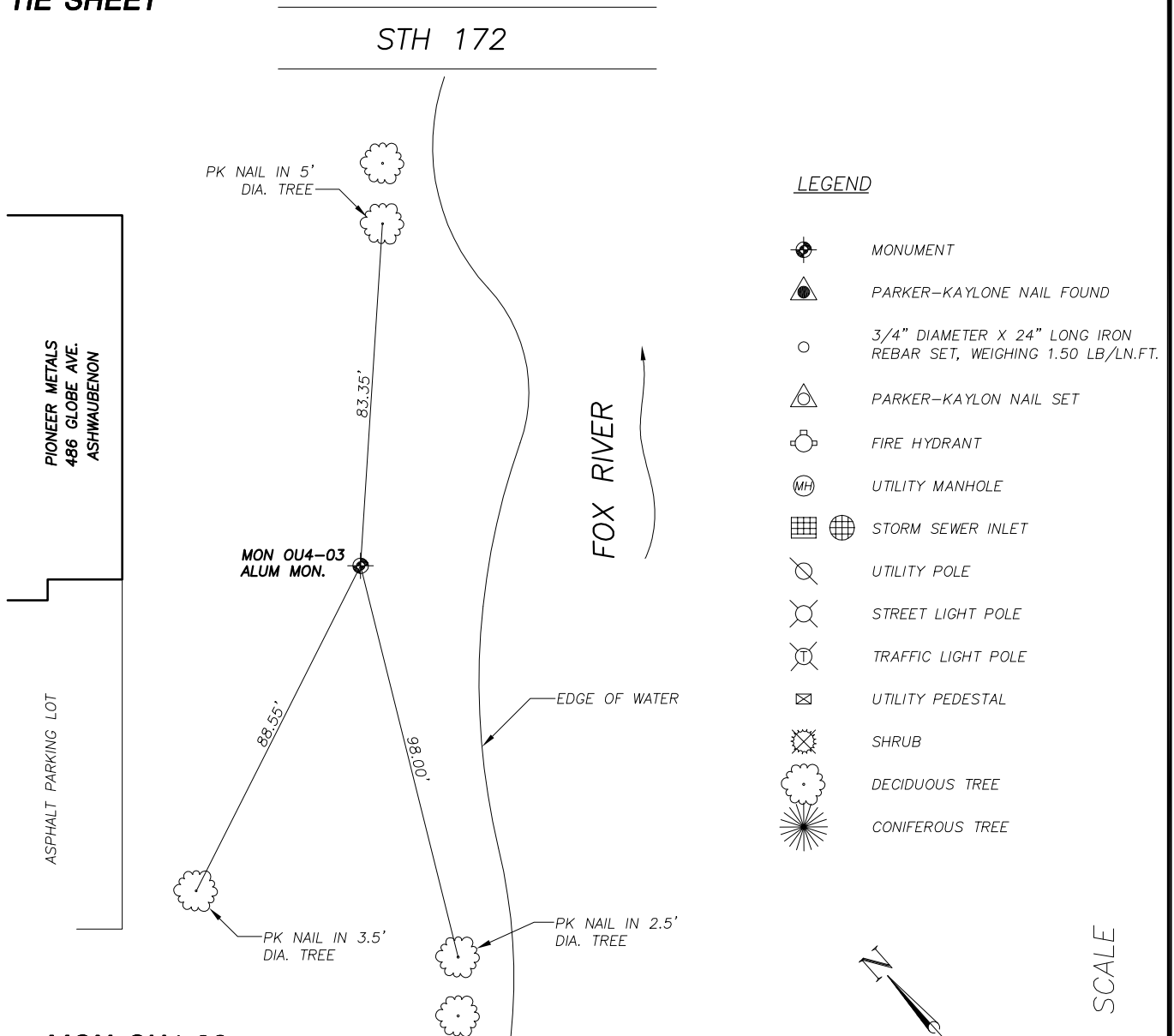
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU4-02
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MON OU4-03

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°28'31.15764"N
240147.52	2477174.22	LONGITUDE	88°03'03.77942"W
		ELLIPSOID HGT.	471.03
		DYNAMIC HGT.	589.65
		NAVD88 ELEV.	589.72

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1464942.27	2214572.63

LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS

CHECKED BY: EAS

PROJECT NO: 03C1200

DATE: 12-04-03

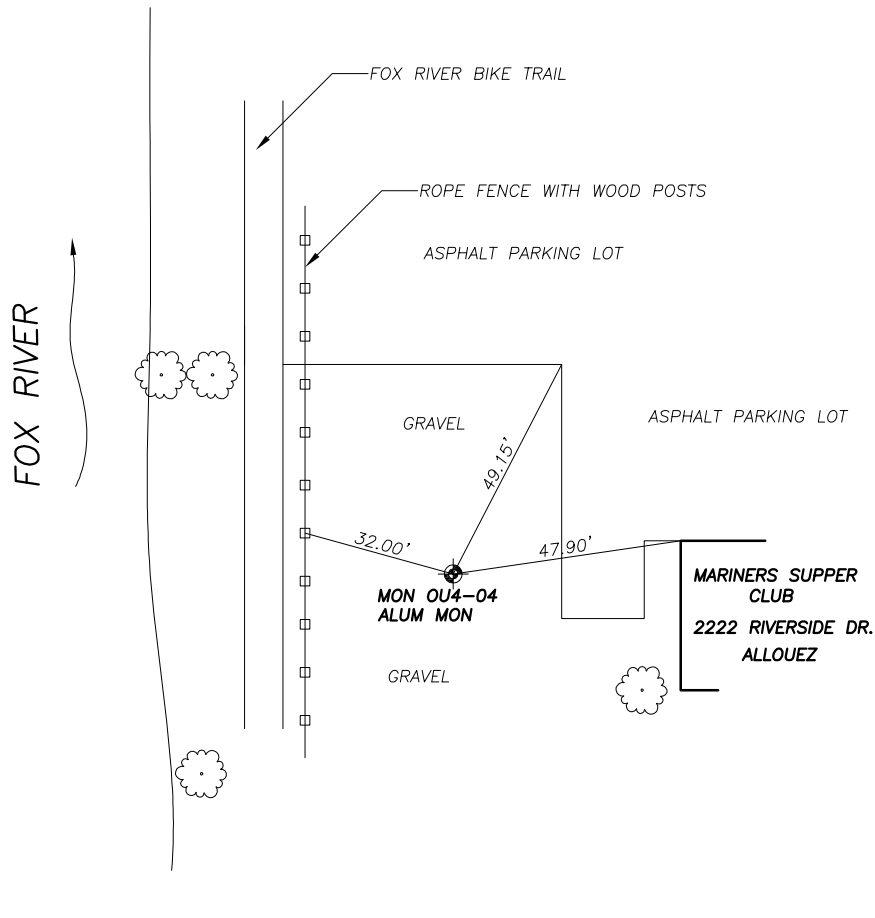
MON NO. OU4-03

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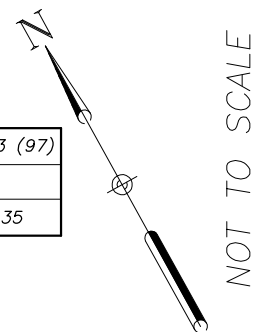


MON OU4-04

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°29'00.29941"N
243220.51	2482191.76	LONGITUDE	88°01'53.57137"W
		ELLIPSOID HGT.	468.33
		DYNAMIC HGT.	586.94
		NAVD88 ELEV.	587.01

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1468014.23	2219590.35



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

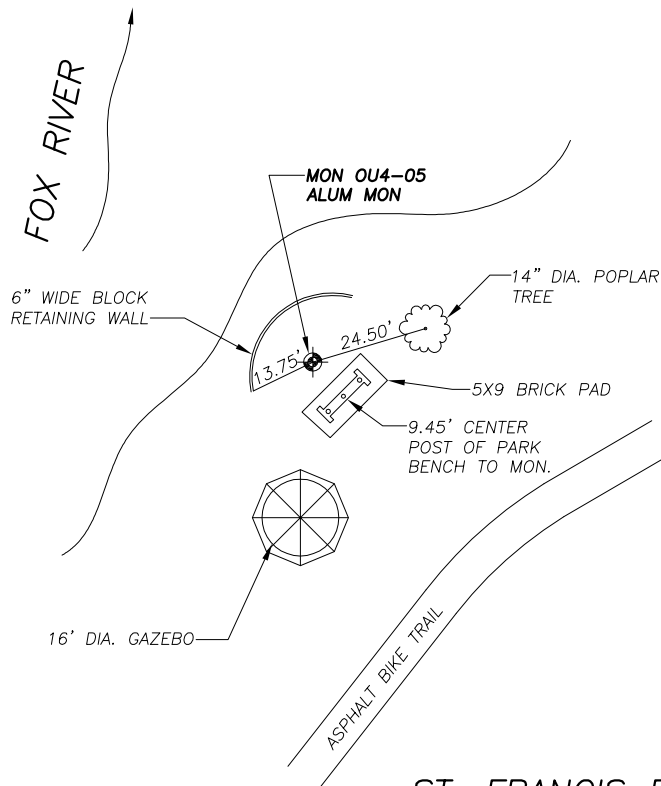
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608-848-5060

TIE SHEET

RAILROAD BRIDGE OVER FOX RIVER



LEGEND

- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

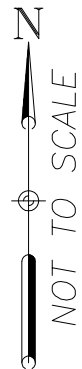
ST. FRANCIS PARK
1700 BLOCK RIVERSIDE DR.
ALLOUEZ

MON OU4-05

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°29'26.40987"N
245910.49	2484048.42	LONGITUDE	88°01'27.06594"W
		ELLIPSOID HGT.	467.10
		DYNAMIC HGT.	585.71
		NAVD88 ELEV.	585.78

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1470703.76	2221447.33

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



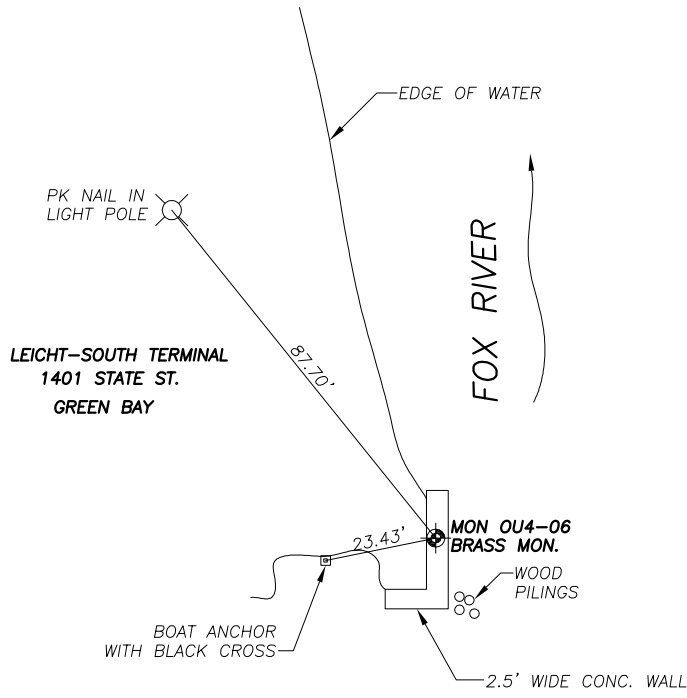
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU4-05
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TIE SHEET



LEGEND

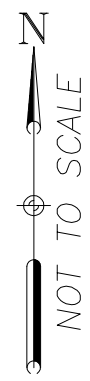
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
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- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU4-06

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°29'50.01150"N
248294.41	2483767.26	LONGITUDE	88°01'30.14374"W
		ELLIPSOID HGT.	465.66
		DYNAMIC HGT.	584.28
		NAVD88 ELEV.	584.35

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1473087.58	2221166.56

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU4-06
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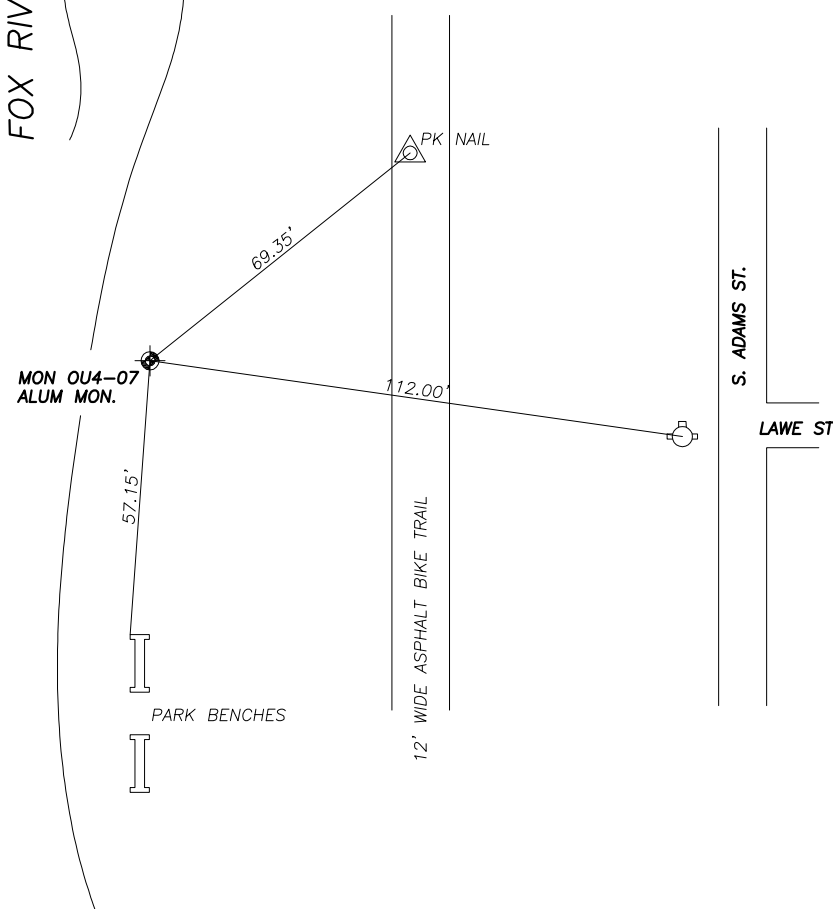
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 VERONA, WISCONSIN 53593
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TIE SHEET

FOX RIVER

MAIN ST. STH 29
GREEN BAY



LEGEND

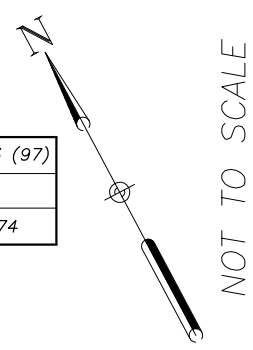
- MONUMENT
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- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
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- STREET LIGHT POLE
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- SHRUB
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- CONIFEROUS TREE

MON OU4-07

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°30'18.74040"N
251227.38	2484705.04	LONGITUDE	88°01'16.22306"W
		ELLIPSOID HGT.	464.88
		DYNAMIC HGT.	583.50
		NAVD88 ELEV.	583.57

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1476020.23	2222104.74

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



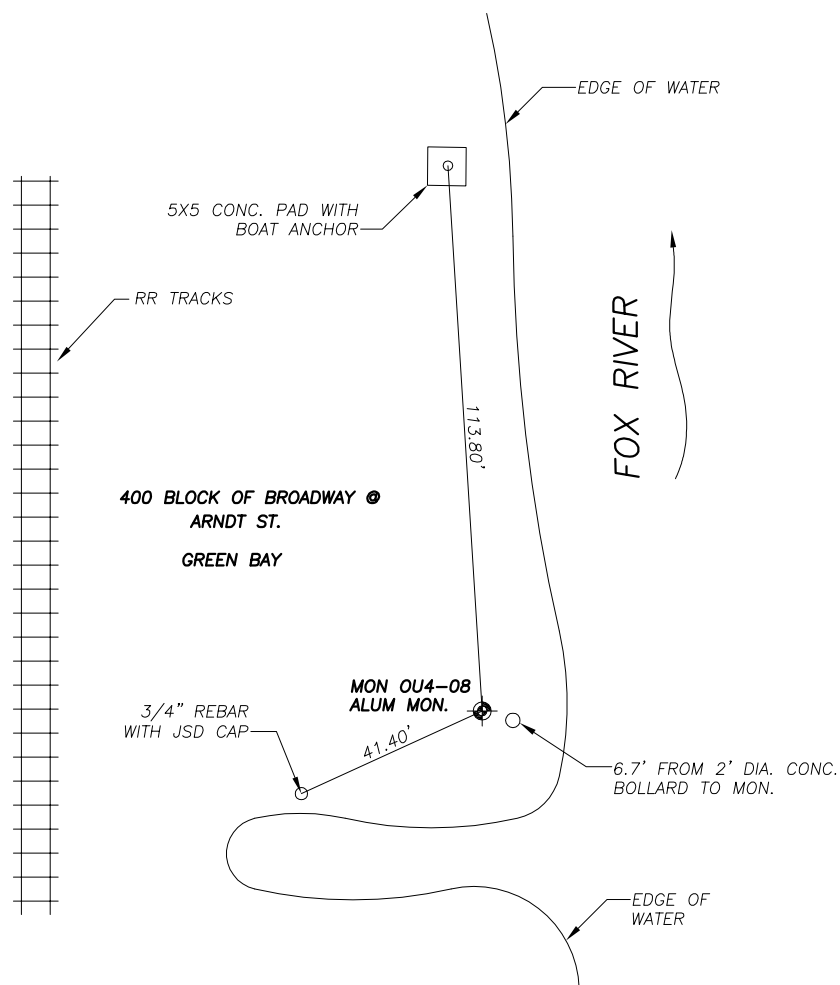
LOWER FOX RIVER
MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU4-07
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VERONA, WISCONSIN 53593
608-848-5060

J:\Projects\

TIE SHEET



LEGEND

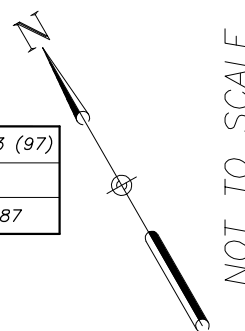
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
-
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU4-08

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°30'39.82800"N
253359.14	2484526.83	LONGITUDE	88°01'17.96485"W
		ELLIPSOID HGT.	465.21
		DYNAMIC HGT.	583.84
		NAVD88 ELEV.	583.91

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1478151.89	2221926.87



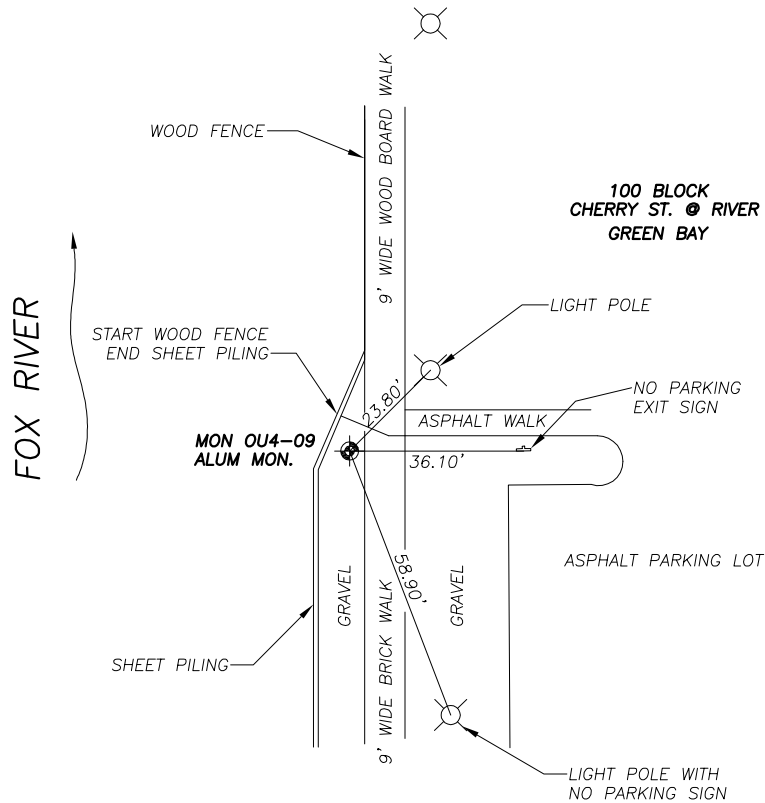
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS	CHECKED BY: EAS	PROJECT NO: 03C1200	DATE: 12-04-03	MON NO. OU4-08
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TIE SHEET



HWY 29 BRIDGE

MON OU4-09

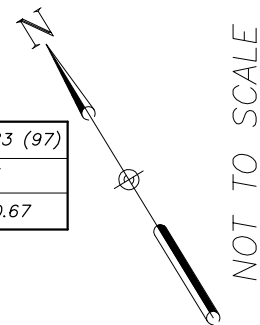
MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°30'56.56941"N
255087.04	2485840.44	LONGITUDE	88°00'59.25959"W
		ELLIPSOID HGT.	465.48
		DYNAMIC HGT.	584.11
		NAVD88 ELEV.	584.18

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1479879.50	2223240.67

LEGEND

- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.F.T.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE



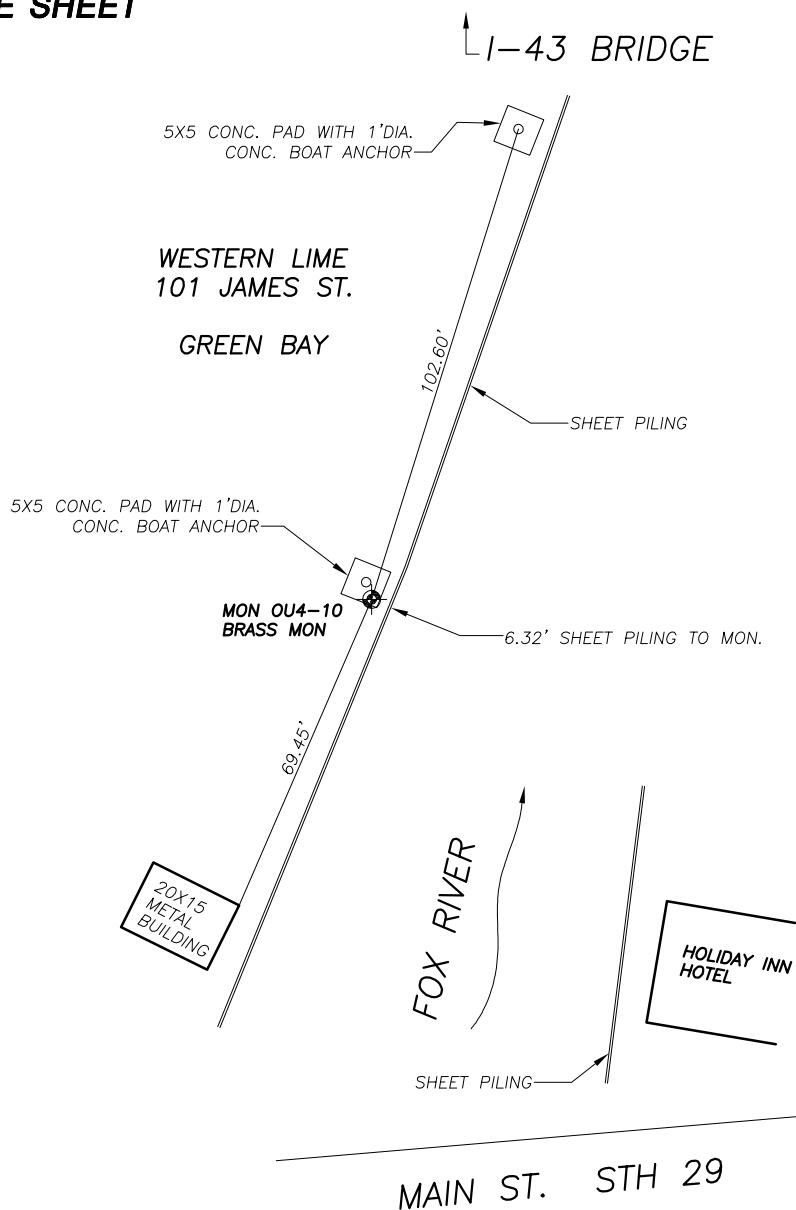
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU4-09

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TIE SHEET



LEGEND

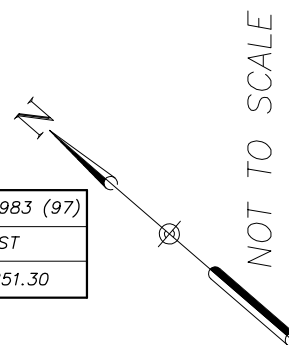
- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLONE NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

MON OU4-10

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°31'12.33209"N
256698.67	2486450.87	LONGITUDE	88°00'50.29343"W
		ELLIPSOID HGT.	467.23
		DYNAMIC HGT.	585.87
		NAVD88 ELEV.	585.94

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1481490.95	2223851.30



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU4-10

JSD

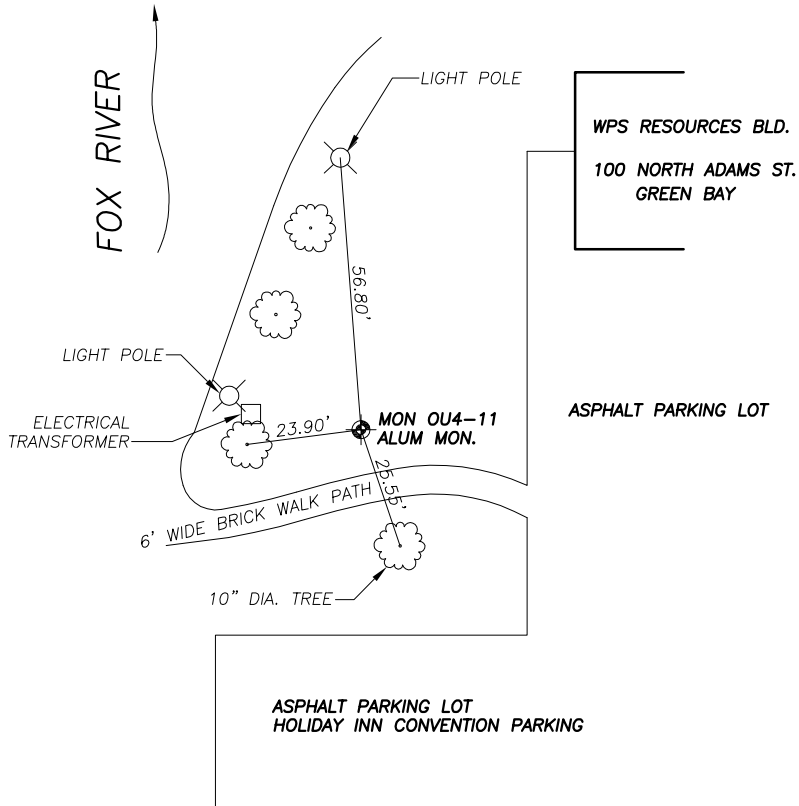
Jenkins Survey & Design, Inc.
161 HORIZON DRIVE, STE 101
VERONA, WISCONSIN 53593
608-848-5060

TIE SHEET

I-43 BRIDGE

LEGEND

-  MONUMENT
-  PARKER-KAYLONE NAIL FOUND
-  3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.F.T.
-  PARKER-KAYLONE NAIL SET
-  FIRE HYDRANT
-  UTILITY MANHOLE
-  STORM SEWER INLET
-  UTILITY POLE
-  STREET LIGHT POLE
-  TRAFFIC LIGHT POLE
-  UTILITY PEDESTAL
-  SHRUB
-  DECIDUOUS TREE
-  CONIFEROUS TREE

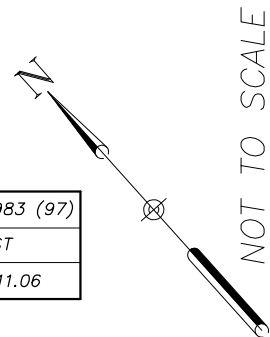


MON OU4-11

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°31'11.05131"N
256587.53	2487210.69	LONGITUDE	88°00'39.84676"W
		ELLIPSOID HGT.	467.68
		DYNAMIC HGT.	586.32
		NAVD88 ELEV.	586.39

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1481379.71	2224611.06

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



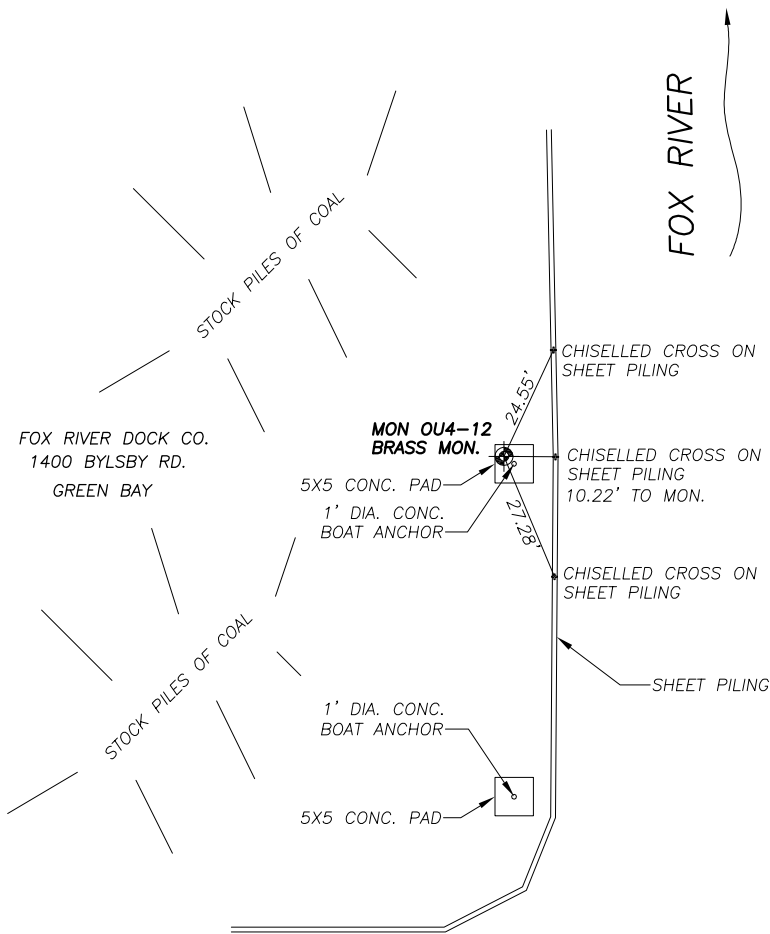
LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU4-11

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608-848-5060

TIE SHEET



LEGEND

- MONUMENT
- PARKER-KAYLONE NAIL FOUND
- 3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
- PARKER-KAYLON NAIL SET
- FIRE HYDRANT
- UTILITY MANHOLE
- STORM SEWER INLET
- UTILITY POLE
- STREET LIGHT POLE
- TRAFFIC LIGHT POLE
- UTILITY PEDESTAL
- SHRUB
- DECIDUOUS TREE
- CONIFEROUS TREE

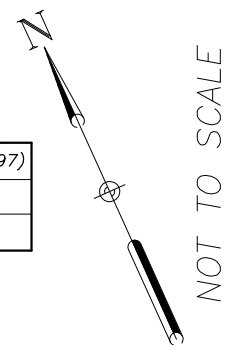
I-43 BRIDGE

MON OU4-12

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°32'04.23358"N
261985.70	2487658.17	LONGITUDE	88°00'31.84552"W
		ELLIPSOID HGT.	467.23
		DYNAMIC HGT.	585.89
		NAVD88 ELEV.	585.96

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1486777.53	2225059.31

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU4-12

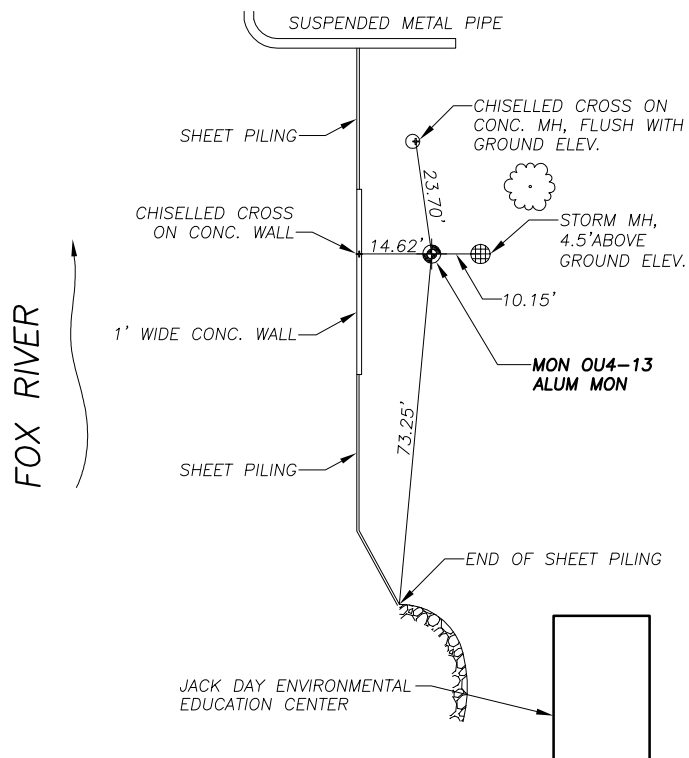
JSD

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161 HORIZON DRIVE, STE 101
VERONA, WISCONSIN 53593
608-848-5060

TIE SHEET

LEGEND

-  MONUMENT
-  PARKER-KAYLONE NAIL FOUND
-  3/4" DIAMETER X 24" LONG IRON REBAR SET, WEIGHING 1.50 LB/LN.FT.
-  PARKER-KAYLONE NAIL SET
-  FIRE HYDRANT
-  UTILITY MANHOLE
-  STORM SEWER INLET
-  UTILITY POLE
-  STREET LIGHT POLE
-  TRAFFIC LIGHT POLE
-  UTILITY PEDESTAL
-  SHRUB
-  DECIDUOUS TREE
-  CONIFEROUS TREE



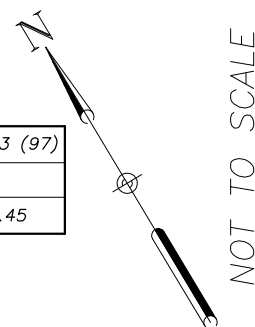
GREEN BAY BOAT RAMP
BAY BEACH RD.

MON OU4-13

MEASURED COORDINATE VALUES, CENTRAL ZONE, NAD 1983 (97)			
NORTH	EAST	LATITUDE	44°32'18.02050"N
263416.96	2489070.18	LONGITUDE	88°00'11.87159"W
		ELLIPSOID HGT.	469.02
		DYNAMIC HGT.	587.68
		NAVD88 ELEV.	587.75

NOTE: ALL COORDINATE, HEIGHTS, AND ELEVATION VALUES ARE MEASURED IN FEET.

WI TRANSVERSE MERCATOR 1983 (97)	
NORTH	EAST
1488208.52	2226471.45



LOWER FOX RIVER MAPPING AND MONUMENTATION PROJECT

DRAWN BY: MJS CHECKED BY: EAS PROJECT NO: 03C1200 DATE: 12-04-03 MON NO. OU4-13

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161 HORIZON DRIVE, STE 101
VERONA, WISCONSIN 53593
608-848-5060

APPENDIX C

LISTING OF EXISTING NGS CONTROL POINTS USED

APPENDIX C

LIST OF EXISTING NGS CONTROL POINTS USED

AA4613
AA4620
AA4621
AA4622
AH5305
DE7436
DE7568
DE7570
DE7574
DE7578
DE7608
DE7617
DE7621
DE7704
DE7765
DE7781
DF5989
DF5990
DF6002
DF6065
DF6096
DF6097
DF6118
DF6119
DF6127
PN1346

Note: These points are owned and maintained by others. Complete source information on these points can be found at <http://www.ngs.noaa.gov/>.

APPENDIX D

COORDINATE VALUES AND HEIGHTS FOR CONTROL POINTS

APPENDIX D
COORDINATE VALUES AND HEIGHTS FOR CONTROL POINTS



161 Horizon Drive, Suite 101
Verona, WI 53593
(608) 848-5060 Office
(608) 848-2255 Fax

JSD Project No. 03C1200
Computed By: Ed Short
Checked By: John Konopacki
Date: November 20, 2003

Point ID	Wisconsin State Plane, Central Zone, NAD 83 (1997), feet		NAVD 88 Elevation, feet	Geographic Coordinates, NAD 83 (1997)		WTM 83 (1997), feet		Elipzoid Height, feet	Dynamic Height, feet	Description
	Northing	Easting		Latitude	Longitude	Northing	Easting			
OU1-01	133844.46	2369262.19	744.81	44°11'24.46407"N	88°28'19.41159"W	1358676.57	2106655.53	625.66	744.68	FOX RIVER ALUM MON
OU1-02	135959.84	2371346.75	742.77	44°11'44.96142"N	88°27'50.25802"W	1360791.00	2108740.10	623.65	742.64	FOX RIVER ALUM MON
OU1-03	139204.55	2369595.99	741.27	44°12'17.32353"N	88°28'13.44567"W	1364035.37	2106990.44	622.13	741.14	FOX RIVER BRASS
OU1-04	139655.77	2373260.52	751.21	44°12'21.09383"N	88°27'23.03051"W	1364485.68	2110654.26	632.10	751.08	FOX RIVER ALUM MON
OU1-05	144040.46	2370400.07	751.74	44°13'04.91990"N	88°28'01.15593"W	1368870.02	2107795.41	632.61	751.61	FOX RIVER ALUM MON
OU1-06	146479.33	2374335.08	740.44	44°13'28.26223"N	88°27'06.49551"W	1371307.50	2111730.08	621.34	740.31	FOX RIVER BRASS
OU1-07	151979.39	2374924.31	741.26	44°14'22.45446"N	88°26'56.96291"W	1376806.26	2112320.36	622.17	741.13	FOX RIVER ALUM MON
OU1-08	154322.89	2378310.46	742.22	44°14'44.95102"N	88°26'09.83895"W	1379148.54	2115706.30	623.17	742.09	FOX RIVER ALUM MON
OU1-09	153480.83	2380433.30	741.21	44°14'36.23244"N	88°25'40.90567"W	1378306.21	2117828.51	622.18	741.08	FOX RIVER ALUM MON
80-28	155814.41	2382243.04	739.55	44°14'58.92553"N	88°25'15.42654"W	1380638.92	2119638.38	620.53	739.42	ARMY CORP MON - CONC W/ BRASS CAP
OU1-10	155819.93	2382245.98	738.84	44°14'58.97948"N	88°25'15.38481"W	1380644.44	2119641.31	619.83	738.71	FOX RIVER ALUM MON
94-2	157284.40	2384087.21	741.13	44°15'13.08402"N	88°24'49.70087"W	1382108.22	2121482.48	622.13	741.00	ARMY CORP MON - BRASS CAP
OU1-11	157391.93	2383998.76	741.85	44°15'14.16276"N	88°24'50.88703"W	1382215.75	2121394.07	622.85	741.72	FOX RIVER ALUM MON
80-08	204202.83	2459112.01	603.27	44°22'40.50399"N	88°07'24.27915"W	1429003.97	2196505.45	484.62	603.19	ARMYCORP MON - CONC W/ BRASS CAP
OU3-01	204239.37	2459202.26	598.87	44°22'40.84405"N	88°07'23.02528"W	1429040.48	2196595.70	480.21	598.79	FOX RIVER ALUM MON
OU3-02	207152.52	2461330.93	593.13	44°23'09.11683"N	88°06'52.79281"W	1431952.92	2198724.73	474.48	593.05	FOX RIVER ALUM MON
OU3-03	211368.81	2461215.04	594.05	44°23'50.76803"N	88°06'53.04032"W	1436168.82	2198609.67	475.39	593.97	FOX RIVER ALUM MON
OU3-04	211654.59	2464622.82	590.13	44°23'52.80540"N	88°06'06.02455"W	1436453.91	2202017.17	471.48	590.05	FOX RIVER ALUM MON
OU3-04A	216907.63	2466337.05	590.87	44°24'44.26848"N	88°05'40.72262"W	1441706.15	2203732.24	472.22	590.79	FOX RIVER ALUM MON
OU3-05A	222597.13	2471513.13	593.59	44°25'39.23091"N	88°04'27.57377"W	1447394.19	2208908.92	474.94	593.51	FOX RIVER ALUM MON
OU3-05B	219554.99	2469190.16	593.65	44°25'09.74096"N	88°05'00.56586"W	1444352.74	2206585.59	475.00	593.57	FOX RIVER ALUM MON
OU3-06	227783.79	2473332.86	592.34	44°26'30.00771"N	88°04'00.80270"W	1452580.11	2210729.44	473.69	592.26	FOX RIVER ALUM MON

JSD Project No. 03C1200
 Computed By: Ed Short
 Checked By: John Konopacki
 Date: November 20, 2003

161 Horizon Drive, Suite 101
 Verona, WI 53593
 (608) 848-5060 Office
 (608) 848-2255 Fax

Point ID	Wisconsin State Plane, Central Zone, NAD 83 (1997), feet		NAVD 88 Elevation, feet	Geographic Coordinates, NAD 83 (1997)		WTM 83 (1997), feet		Elipsoid Height, feet	Dynamic Height, feet	Description
	Northing	Easting		Latitude	Longitude	Northing	Easting			
OU3-07	228615.60	2474808.98	591.65	44°26'37.87201"N	88°03'40.18811"W	1453411.60	2212205.60	473.00	591.57	FOX RIVER ALUM MON
OU3-08	230353.09	2474477.85	592.34	44°26'55.10286"N	88°03'44.17976"W	1455149.01	2211874.80	473.68	592.26	FOX RIVER ALUM MON
CEDPL	230882.34	2474196.76	592.70	44°27'00.39388"N	88°03'47.87967"W	1455678.27	2211593.82	474.04	592.63	ARMY CORP - BRASS MON
CEDPL7	230912.11	2474221.34	592.63	44°27'00.68201"N	88°03'47.53107"W	1455708.03	2211618.41	473.97	592.56	US LAKE MON - BRASS CAP
75-33	231005.58	2474034.15	592.75	44°27'01.64887"N	88°03'50.08023"W	1455801.53	2211431.25	474.09		ARMY CORP - BRASS MON
OU4-01	233965.65	2472664.92	585.52	44°27'31.19306"N	88°04'07.98060"W	1458761.61	2210062.64	466.84	585.45	FOX RIVER ALUM MON
93-1	235756.04	2476344.46	584.69	44°27'48.00088"N	88°03'16.67083"W	1460551.24	2213742.20	466.02	584.62	ARMY CORP MON - CONC W/ BRASS CAP
OU4-02	235809.96	2476401.97	584.07	44°27'48.51961"N	88°03'15.86023"W	1460605.15	2213799.72	465.40	584.00	FOX RIVER ALUM MON
OU4-03	240147.52	2477174.22	589.72	44°28'31.15764"N	88°03'03.77942"W	1464942.27	2214572.63	471.03	589.65	FOX RIVER ALUM MON
OU4-04	243220.51	2482191.76	587.01	44°29'00.29941"N	88°01'53.57137"W	1468014.23	2219590.35	468.33	586.94	FOX RIVER ALUM MON
OU4-05	245910.49	2484048.42	585.78	44°29'26.40987"N	88°01'27.06594"W	1470703.76	2221447.33	467.10	585.71	FOX RIVER ALUM MON
OU4-06	248294.41	2483767.26	584.35	44°29'50.01150"N	88°01'30.14374"W	1473087.58	2221166.56	465.66	584.28	FOX RIVER BRASS
75-23	250589.88	2484558.29	584.57	44°30'12.48226"N	88°01'18.46172"W	1475382.79	2221957.90	465.87	584.50	ARMY CORP MON - CONC W/ BRASS CAP
OU4-07	251227.38	2484705.04	583.57	44°30'18.74040"N	88°01'16.22306"W	1476020.23	2222104.74	464.88	583.50	FOX RIVER ALUM MON
OU4-08	253359.14	2484526.83	583.91	44°30'39.82800"N	88°01'17.96485"W	1478151.89	2221926.87	465.21	583.84	FOX RIVER ALUM MON
OU4-09	255087.04	2485840.44	584.18	44°30'56.56941"N	88°00'59.25959"W	1479879.50	2223240.67	465.48	584.11	FOX RIVER ALUM MON
OU4-10	256698.67	2486450.87	585.94	44°31'12.33209"N	88°00'50.29343"W	1481490.95	2223851.30	467.23	585.87	FOX RIVER BRASS
OU4-11	256587.53	2487210.69	586.39	44°31'11.05131"N	88°00'39.84676"W	1481379.71	2224611.06	467.68	586.32	FOX RIVER ALUM MON
73-1	260080.06	2487390.08	583.40	44°31'45.48607"N	88°00'36.19036"W	1484872.03	2224790.95	464.68	583.33	ARMYCORP MON - CONC W/ BRASS CAP
OU4-12	261985.70	2487658.17	585.96	44°32'04.23358"N	88°00'31.84552"W	1486777.53	2225059.31	467.23	585.89	FOX RIVER BRASS
OU4-13	263416.96	2489070.18	587.75	44°32'18.02050"N	88°00'11.87159"W	1488208.52	2226471.45	469.02	587.68	FOX RIVER ALUM MON



APPENDIX E

CALCULATION OF SHIFT IN WTM COORDINATES FROM NAD 83 (1991) TO NAD 83 (1997) AT WDOT HARN LOCATIONS

APPENDIX E

CALCULATION OF SHIFT IN WTM COORDINATES FROM NAD 83 (1991) TO NAD 83 (1997) AT WDOT HARN LOCATIONS November 28, 2003

	WTM 83 (1997), feet		WTM 83 (1991), feet		Shift from (1991) to (1997), feet		
	Northing	Easting	Northing	Easting	Northing	Easting	Distance
<u>Brown County</u>							
PN1345 Green Bay HARN	1501166.349965	2182675.062227	1501166.241586	2182675.152251	0.11	-0.09	0.12
PM0538 Bruce Reset HARN	1484966.060271	2253648.887332	1484965.954375	2253648.984226	0.11	-0.10	0.12
<u>Outagamie County</u>							
PN1346 Kaukauna HARN	1368303.262535	2149680.581563	1368303.197661	2149680.676857	0.06	-0.10	0.07
					Average for Counties Transected by LFR:		
					0.09	-0.09	0.10
<u>Waushara County</u>							
PN1307 Drake HARN	1347859.759942	1828618.825753	1347859.686380	1828618.886231	0.07	-0.06	0.08

Notes:

1. NAD 83 (1991) and NAD 83 (1997) latitude-longitude values were taken from NGS datasheets. At these locations, the NAD 83 (1991) data are now labeled by NGS as "superceded control." Each set of values was transformed to WTM using WISCON, v. 1.7.
2. The HARN point in Waushara County is provided for comparison purposes only. It is located west of Little Lake Butte des Morts and provides a data point to help to illustrate the shift on all sides of the Fox River project area.